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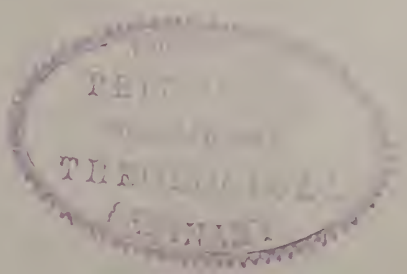

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THE HUMAN AND THE BRUTE MIND.

THE question whether the human intellect differs from the brute mind in degree only, or also in essence and kind, is not new in the history of philosophy. It has been debated with earnestness in every age, at least since the revival of letters. In the sixteenth century, Montaigne, who is followed by Charron and Gassendi, undertakes to prove that there is a wider interval of mental power between one man and another, than between man and the most sagacious brute. In his usual fleering and sceptical manner, he says, we must push man back into the crowd of animals from which, in the arrogance of his heart, he aspires to separate himself. In fact, so far as the animal acts from instinct, Montaigne declares it is the superior, since it then accomplishes at once, and without reflection or effort, tasks which man can perform only imperfectly and after repeated failures.

In the next century, Descartes went just as far into the opposite extreme, when he maintained that brutes are mere automata, destitute not only of intellect and feeling, but even of life. If the animal goes in pursuit of any object, he says, it is because an impression has been made upon its organs of sense, through which a spring is put in motion, that propels the beast in chase just as mechanically as the hands of a watch travel round its face after it has been wound up. Its inarticulate cries, which we wrongly interpret as signs of emotion, are, like the striking of a clock at determinate intervals, caused and regulated by its internal machinery. This is the noted hypothesis of the animal-machines, which was discussed with so much spirit, both in prose and verse, especially in France, long after the death of its author. Fontenelle, tho a Cartesian in other respects, took sides on this question against his master; while Pascal, Malebranche, and the Port-Royalists defended the doctrine of automatism. Voltaire, in his usual mischievous spirit, entered

into the dispute, and enjoyed the fun of arguing that man is no better than a brute.

In our day, the disciples of Herbert Spencer, and the evolutionists generally, take sides, of course, with Montaigne and against Descartes. As they hold that all modes of being and forms of life, from the lowest to the highest, are successively self-developed, through countless slight gradations, from the primitive atoms which are the formless elements of chaos, so they necessarily believe that all the faculties of the human mind exist also, tho in a rudimentary state, in the mental constitution of the inferior animals, and may even be traced in imagination much farther back, to the mud or dust whence those brutes originated. In his "Descent of Man," accordingly, Mr. Darwin assures us that "the difference in mind between man and the higher animals, great as it is, is *certainly* one of degree and not of kind." In the affection of the dog for his master, for instance, he beholds the rudiments of the religious sentiment; in the social instincts, he finds the elements of morality; and in the inarticulate cries, "aided by gestures and movements of the muscles of the face," by which animals express their emotions, he detects the origin of language. And Mr. Huxley, consistent fatalist as he is, contrives to unite the doctrine of Descartes with that of Montaigne, by maintaining that man also, like the dog, is an only seemingly animate automaton, and therefore does not essentially differ from the machine-brute; since the higher grade of evolution that he has reached sufficiently accounts for what appears to be the greater skill expended upon his construction.

Not much light is thrown upon the discussion of this subject by the marvellous stories, of which so many are current, of the signal forethought, feeling, and contrivance shown by particular animals on special occasions. Few of these anecdotes are so well authenticated as to deserve full credit; and they would not be reported but for their exceptional character. But only the habitual actions of the animal fully evince its real nature and capacities; feats which it may be trained to accomplish, and acts done under an unusual combination of circumstances, and seldom or never repeated, cannot be safely interpreted as proofs of intelligence. Most of them can readily be explained away, since we can hardly suppose that a brute is any wiser at one

time than at another, or that one can be much distinguished for sagacity above his fellows. It is all a matter of interpretation and rather uncertain inference, since we know the animal, so to speak, only from the outside. We can only guess at the state of mind which impelled it to perform a certain act; and we anthropomorphize too much, when we attribute it to the same motive and prevision which would induce us to do likewise. The same cry or gesture may spring from very different emotions under different circumstances, when the power of expression is very limited in its range. Thus, the barking of a dog may be either a cry of alarm, a note of defiance, an outbreak of weariness, or an invitation to joyous frolic. In all these cases, the dog is merely giving voice indiscriminately to any strong emotion. The howling of the same animal is certainly a mournful sound, but it is not necessarily sadness or grief that makes it howl. The essence of language is the purpose or intention to communicate definite thought or emotion to others, and not the mere fact that the feeling is thus imparted, tho perhaps unintentionally. Through its inarticulate cries and gestures, the emotions of one animal may be made known to its fellows, and may thus actually spread an alarm among them, tho certainly not intended as a signal of danger, since the same cries are often repeated when the animal is alone, and there are none who can profit by the warning. If the imprisoned starling, that so much excited the sickly sensibility of Laurence Sterne by its pitiful cry, "I can't get out," had been set at liberty by him, it would still have repeated the words as frequently as ever, and with quite as much perception of their actual meaning.

Let us attempt to clear the way for the consideration of this difficult question, by first enumerating the several powers and capacities which the lower animals unquestionably possess in common with man. We shall thus find ample grounds for our involuntary sympathy with many of them, and shall obtain a clearer understanding of the remaining points wherein their marked deficiencies consist. In the first place, there is no outward act whatever, considered simply as an exercise of nerves and muscles, which brutes cannot perform about as well as man, or even better. They leap, run, climb, and swim; they construct their homes, continue their species, and provide for their

young; they weep,[1] howl, and even articulate. Judging from the indications afforded by these outward acts, we have good reason to conclude that the senses of the lower animals, especially those of vision, hearing, and smell, are in many cases more acute and far-reaching than ours. It is equally evident that they have most of the emotions and passions, the desires and appetites, which incite and govern human conduct. They love, fear, and hate; they are angry, emulous, and revengeful. They are capable of magnanimity, and often clearly indicate curiosity, admiration, and *ennui*. Most of them are gregarious in their habits; they seek the company of their fellows, aid each other, are fond of sport, and distinguish their proper food. Their parental affections are very strong, leading almost to any amount of self-sacrifice, so long as their young need care and protection; but when this period of dependence is outgrown, they seem no longer even to recognize their offspring. They are also much under the influence of habit, and the imitative propensity appears clearly in many of them; the possibility of domesticating them, and training them to the service of man, depending largely upon the development of these two traits.

Passing to the more intellectual part of their nature, it is obvious that many of the brutes have a vivid imagination, and most of them have great facility in recognizing scenes and individuals of which they have had experience. A dog asleep upon the rug before the fire shows, by growls and barks, distinctly enough that he is stemming again in fantasy all the currents of a heady fight. Horses, dogs, and cats retrace with great precision a long road which they have but once travelled over, and never fail to stop at the gate or door which leads to their own home. The doctor's horse knows where most of the patients live about as well as the doctor himself. I do not here allude to any of the cases of supposed sagacity, foresight, and contrivance which are clearly attributable to instinct, an anomalous faculty

[1] At least, Shakespeare declares that they do, and I hold that he is high authority in natural history. He says of the poor wounded stag, that

> "The big round tears
> Coursed one another down his innocent nose
> In piteous chase,"

as he stood on the verge of the brook, "augmenting it with tears."

with which all the lower animals are specially endowed; these are no indications of intellect properly so called, but are rather proofs of the absence of it, or of some serious defect of the mental constitution which needs to be supplemented by the action of so wonderful a substitute as this for reason in the strict sense of the term. Such cases will be considered hereafter, under their appropriate head as manifestations of instinct.

Animals are also capable of mental association, tho they certainly do not associate *ideas;* for, as will be shown hereafter, they have no ideas. They have only the immediate presentation through the senses of particular sights, sounds, odors, etc., together with the power of reviving these in imagination, of recognizing them as sensations formerly experienced, and of associating with them the emotions and passions with which they were originally accompanied. This is the simplest kind of association; it can all be resolved into an effect of habit, and is therefore closely akin to the animal's power of retracing the road which it has once travelled. The brute associates strongly the passion or emotion once aroused with the implement, the person, or the act by which it was first excited. It may even happen, as the animal is more excitable at one time than another, that the mere sight of the implement, or a menace of the repetition of the offensive act, will produce a greater burst of fury than resulted from the original infliction of pain. A dog will bear patiently a good deal of teasing, and a horse will submit to frequent touches with the whip, tho by quickening their pace, and trying to get out of the way, they show clearly enough that the act caused pain and resentment. But there comes a time when the brute is unusually sensitive, and some trivial annoyance, or a mere flourish of the whip, will excite a dangerous burst of passion. An invariably attendant sight or sound, harmless in itself, is also associated with the offensive act as its sign or symbol; and then the familiar cluck, chirrup, or whistle will produce the required act or emotion as surely as if accompanied with a blow. These facts not only explain the theory and method of training domestic animals, but explain away many supposed cases of sagacity, of acting on a premeditated plan, and of nursing suppressed resentment till a fit opportunity arrives for its full manifestation. Many such stories are told of the

elephant, which one who has had large opportunities for observation has recently declared to be a remarkably stupid animal.

What has thus far been admitted undoubtedly tends, as far as it goes, to place the human and the brute mind on a par with each other. Is there, then, any strongly marked and unquestionable defect in the latter, which, when taken together with all its causes and consequences, places an impassable gulf between the two? Undoubtedly there is. The brute is utterly incapable of using language; it certainly cannot talk. This incapacity does not come from any defect in its physical organization, since parrots and several other birds may be taught to articulate words with great distinctness; and many of the mammalia can utter cries and make gestures which might, by convention, become as intelligible as the finger alphabet of the human deaf and dumb. Then their inability to talk must arise from the peculiarities of their mental constitution; and an analysis of the intellectual processes which are involved in the intelligent use of language will show clearly what are the inherent defects in the brute mind. There was as much argument as wit in the remark of a German naturalist, who said, "I will believe that animals have reason, when one of them shall tell me so." Good old John Locke has been much ridiculed for merely citing a story, which he does not profess to believe, about a parrot owned by Prince Maurice, in Brazil, which was able to keep up an intelligent conversation with its visitors. Any attempt to teach animals to use language *meaningly* would deservedly excite equal ridicule, since their utter incapacity in this respect is obvious even to the vulgar. Laura Bridgman, blind, deaf, and dumb from infancy, and thus apparently less fitted for communication with the external world than any of the vertebrate brutes, was yet mentally endowed with an innate capacity for the use of language, which has been so far developed by skilful instruction, that she now keeps a diary, and writes letters, with as large a use of significant phraseology as most educated persons possess. There never was a better illustration than her case presents of the etymological meaning of the word "education," that it signifies *bringing out* of the mind its native capacities, and not merely *putting into* it any amount of useful information. But no Dr. Howe has ever been foolish enough to attempt to teach a parrot or a

monkey to converse, to write a significant sentence, or to read what is thus written. Balaam's ass did not rebuke its master except by a miracle.

What must be the nature of that inherent mental defect which produces this absolute incapacity for the use of intelligible speech? The answer to this question is not doubtful or far to seek. Every significant word in any language is the name or symbol of a "concept;" that is, of what we English formerly called "an abstract general idea." As John Locke remarked long ago, brutes cannot generalize, and therefore they have no ideas to express, and cannot attach any meaning to words as uttered by others. As Bischoff wittily puts it, "the plain reason why animals cannot talk is that they have nothing to say." They can be taught the symbolism of a few proper names; but proper names are not *words*, for they do not connote any meaning, and are therefore not susceptible of definition. Like a colored string hung round the neck, or a chalk-mark on the back, they *denote* the particular and individual act, man, or other object that is intended, but they do not *per se* connote any idea. If I previously know what message is to be imparted, the proper name, or the wave of a handkerchief, may point out to me the person to whom it is to be given. But such a name has no more significance in itself than the wave of the handkerchief. Every word properly so called is the name, not of an individual, but of a class, and it is applicable indifferently to all the members of the class, because it signifies (connotes) those qualities, and only those qualities, which are common to the whole class. Hence, comparison and discernment are needed, in order to know what individuals belong to the class; abstraction is required, so as to confine our attention to their common qualities; and generalization is the mental power whereby we recognize the commonness of those attributes, and the universality of the word within the limits of that class. Each of the mental acts here enumerated is an exercise of *judgment*, and the expression of judgments is the function of language. Hence the proper unit or fundamental element of significant speech is not the word, but the proposition. A single word, "man," does not express any cognition, or impart any fact or incident, except so far as it is explicated and made clear to thought by one or more of the judgments out of which

it was first constituted, such as "man is mortal," "man is rational," etc. Consequently, brutes cannot grasp the meaning of a word, because they are mentally incapable of forming a judgment; *i.e.*, of *thinking a sentence*, wherein a predicate is significantly affirmed of a subject. If one of them hears a word of command, it is to him only a symbol, like a whistle or wave of the hand, with which is associated a certain emotion, and, through the unconscious force of habit, the emotion thus excited, leads him to perform the act which his master intended. It is of no use to utter a sentence or state a proposition to him, for he cannot understand it, and it will have no more effect on him than a single word, or catcall, or a gesture. The phrase "the human understanding" is a pleonasm, since every understanding is human or divine. The brute has no understanding, because it is incapable of *thought* strictly so called; that is, of comparison, discernment, and classification. Through the force of habit, and of associating emotions, as of pain and pleasure, with their signs, the animal is capable of being *trained;* but it is not susceptible of *education.* Nothing can be brought out of its mind, because nothing preëxists in it which partakes of the nature of thought. Then the gulf between the brute and the human mind can never be bridged over; the two things being radically unlike, one might as well attempt to develop a football into a syllogism.

Because they have no thoughts of their own, and are incapable of interpreting the thoughts of others, the lower animals, as Schopenhauer remarks, live entirely in the present. They have no proper past or future. Their mental horizon is strictly limited to the objects and events which *now* affect their senses. It is true, that they may imagine sensations which do not actually exist; but they cannot distinguish them as imagined from those which are real. The past may be presented in imagination, but it is not recognized as past; that is, it is not consciously assigned to a definite previous experience. It is merely a fictitious enlargement of the scene that is actually before the eyes. Because incapable of comparison and discernment in thought, the animal cannot distinguish the fictitious from the real, or what is, from what was, present to sense. Hence it probably does not apprehend either time or number, since these are not direct presenta-

tions of sense, but can only be cognized in thought. Indeed, time and number are mutually dependent; neither can be recognized without the other. Time can be thought only as a succession, a larger or smaller number, of moments; and number can be apprehended only by telling off successive units through a longer or shorter interval of time. Many familiar facts seem to indicate that the brutes have no sense of number. One puppy after another may be secretly abstracted from a numerous litter, and the mother shows no uneasiness or sense of loss; but she whines piteously after the last one is taken. The hen acts in a similar manner with a numerous brood of chickens. Hence, because incapable of numeration, the brute cannot distinguish between a longer and a shorter interval of time; that is, it has no apprehension of time as such. More briefly still, to distinguish the present from the past would require an act of comparison, which the animal has no power to perform. Being without a conscious past, the brute is also without a future, since even to human foresight, the future is only the shadow which the past throws in advance. The present moment, with its special sensations and emotions, its pleasures and its pains, either coming singly or associated by habit, forms the whole conscious life of the cat and the dog. They have no apprehension of the future, and therefore no dread of death.

> "The lamb thy riot dooms to bleed to-day,
> Had he thy reason, would he skip and play?
> Pleased to the last he crops the flowery food,
> And licks the hand just raised to shed his blood."

A very instructive analogy is pointed out by Leibnitz, in expounding his system of the development of all living things, when he says that the inorganic world is an aggregate of undeveloped or *sleeping* monads, an animal is a *dreaming* monad, and man is a monad that has been *waked up*. The whole mental life of a brute bears a close resemblance to the long-continued dream of a human being. In visions of the night, the friend whom we lost long ago comes again before us, talks and acts with us in the old familiar way, and we recognize him as our friend, and are not at all astonished at his living presence, because we have not the slightest recollection of the fact that he

died some ten years ago. At another time, some scene or incident of our early youth is again presented to us, just as vividly as when we first witnessed it, and we are a boy once more, the many intervening years of manhood being totally forgotten. Crabbe has marked with his usual force and distinctness this loss of the consciousness of time in our dreams:

> "There was I fixed, I know not how,
> Condemned for untold years to stay;
> Yet years were not,—one dreadful *now*
> Endured no change of night or day.
> The same mild evening's sleeping ray
> Shone softly solemn and serene,
> And all-that time I gazed away
> The setting sun's sad rays were seen."

Other objects and events flit before the mind's eye in a confused succession, incoherent, having no bond of union as causes and effects, or in any way influencing each other, and we do not wonder in the least at the strange manner in which they are jumbled together. The understanding is asleep, the senses are closed, but the imagination, or picture-framing faculty, is more vivid and active than ever, because the restraint in which it is usually held by the faculties of perception and reflection is now wholly taken away. We take no note of time. The agony of some fancied event, such as falling from a considerable hight, which ought to occupy only a few seconds, is indefinitely protracted, and we are not at all surprised that it lasts so long. But then, again, incidents in our life's history which would fill out months and years, such as a voyage to the antipodes, or a period of trial and imprisonment, are compressed into a few minutes, and we do not wonder at their brevity. What is very strange, the conscience or moral faculty seems to be paralyzed during sleep. Very good men dream of committing frightful crimes without the least compunction, and in fact without consciousness that they are anything more than innocent recreations. Here, too, is a remarkable analogy with the brute mind, which is not immoral, simply because it is *un*moral; that is, without any sense of the difference between right and wrong.

We can now see how it is that the lower animals are unable to profit by their past experience, and therefore, either

as individuals or as a race, they are incapable of any mental improvement. Experience is simply a record, whether preserved in memory or in writing, of former observations and experiments. It is a history of the past, in which we distinguish one class of events as followed by certain consequences from another class that were not so followed. Evidently this is an operation of memory, and of comparison and discernment, and therefore it is a function of *thought* strictly so called. We separate the instances of success from those of failure, noticing in each case the invariably antecedent or concomitant circumstances. Then, by the light of an *a priori* principle which no experience can justify, we assume that the future will resemble the past, or, in other words, that the course of nature will be uniform in the future as it has been in the past. I say no experience can justify this assumption, for it relates to the future, while experience is concerned solely with the past. Experience can only say that the course of nature *has been* uniform, but it is surely incompetent to declare what the course of nature *will be*. The future is always a lottery; I may have drawn a blank thousands of times; but at the very next drawing, my number may come up a prize. Till within a recent period, innumerable observations went to show that the body of a quadrupedal mammal is never terminated by a bill like that of a duck; but about a century ago, such an animal was discovered in the ornithorhyncus of New Holland. An exception to the law, now deemed to be universal, that every ruminating animal divides the hoof, may be found to-morrow. In truth, so far as the organic world is concerned, besides saying that the course of nature in many respects is tolerably uniform, we ought to add that nature never exactly repeats itself; for, as Leibnitz long ago remarked, no two whelps of the same litter, and no two leaves on the same bush, are ever precisely alike. A brute cannot be made wiser by any amount of experience because it cannot compare and distinguish, and is therefore incapable of apprehending any general truth, such as that which concerns the course of nature. It is always a slave of habit, whether the oft-repeated act is beneficial or injurious. It may be corrected by discipline, it is true, but only because a feeling of pain or pleasure is thereby artificially and blindly associated with an action otherwise meaningless.

Every one's observation of familiar facts will supply instances enough to prove this stationary character of the brute mind which arises from its inability to profit by experience. The moth flies again into the flame which had repeatedly singed its wings within a few minutes. A bee or wasp, attempting to escape from a room which it had accidentally entered, will knock its head fruitlessly for a long time against the same pane of glass, tho it might find free egress a few inches lower down. The typical form of nest, cell, or web, and the same routine of conduct, are blindly and persistently repeated, tho a change of circumstances has made them inadequate or useless for the end in view, and tho a slight and easy modification of them would render them again useful and agreeable. The act and the structure, which were needed and even indispensable while the animal was in its wild state, are renewed in its domesticated condition, tho they have then become meaningless and even injurious. The tamed squirrel, which has received more food than it craves for the moment, will scratch at the bottom of its wire cage and place a nut there, tho it should have learned from experience that it is no longer necessary to hide a store of food for future exigencies. In like manner, a half-domesticated beaver, which had the run of the house, attempted to build a dam with any materials that came in its way, tho there was no water near, and neither shelter nor concealment were now required. The lesson which nature originally taught the animal was so thoroughly learned that it is repeated by rote, come what may, evidently without any perception of its real meaning, or any ability to supplement it by the teachings of experience. Hence it is that the peculiar home, which every species of insect and bird constructs for itself, is built on the same pattern through an indefinite lapse of centuries, no improvements being copied from its neighbors, and none suggested by a forced change in its locality and modes of life.

This essential defect of the brute mind enables us to appreciate the breadth of the gulf which separates it from the human intellect, when we consider that man depends entirely upon experience for the preservation of his life, the fulfilment of his purposes, and the daily and even hourly regulation of his conduct. It is only by actual trial and through many efforts,

failures, and errors, that we learn the rules of prudence, and how to find our way through the labyrinth of this world's affairs. It is only by experience that we are enabled to keep out of fire and water, to distinguish our food from our poison, to separate our friends from our enemies, and either to help others or to save ourselves. On this single foundation, indeed, is built up the whole fabric of human knowledge; for altho primitive convictions and truths spiritually discerned enter into the structure, and in some measure regulate its growth and determine its character, these *a priori* elements become pertinent and available for the guidance of conduct only so far as actual occurrences furnish occasions on which we may reduce them to practice. They supply, to adopt Kant's phraseology, only *the forms* of cognition, and these are comparatively abstract and void till our life's history furnishes *the matter* to which they are applicable. Conscience, for example, bids me observe certain principles of action, but leaves me to learn from observation how best to act upon them, and what are the tests of their due observance either by myself or others.

But each man's personal and individual experience is far too narrow and limited, especially in the earlier periods of life, to furnish adequate guidance for all exigencies that may arise, or a sufficient foundation for all the knowledge that he craves. It needs to be largely supplemented by other men's experience, whether these are our contemporaries or the members of former generations. Hence the peculiarly human endowment of language, as the indispensable means for the advancement of knowledge and the improvement of life, through the cumulation of the experience of the race. The lower animals have no need of communicating with each other, because they have no useful lessons to teach; as no one of them can put to any use the little store of his own experience, he would gain nothing by increasing this store through what might be added to it by his fellows. They cannot accumulate or transmit knowledge, because they are originally incapable of profiting by their own experience, and therefore they have nothing to impart to others. As already remarked, they do not talk because they have nothing to say.

We can now see a reason for the wonderful fact, to which I have already adverted—that, at least in the organic living world,

nature takes good care never to exactly repeat herself. She never, even by accident, makes any one living thing indistinguishably like another. It is not that she is incapable of producing perfect uniformity in her work; for she does produce it in the inorganic world, where uniformity is the rule and any departure from it is the exception. The specific gravity of any elementary substance, the proportions in which such substances are chemically united into compounds, the definite forms into which they crystallize, the modes of action or affinities of different reagents, and many other instances of nature's work in this province, are precisely similar to each other; they do not vary even by a hair's breadth. Far otherwise is it in the world of living organisms, where variety is the rule and uniformity is the exception; nay, it is not even the exception, for not one such exception—that is, no case of two indiscernibles—can be produced. So far as I know, Leibnitz is the only philosopher of modern times who has noticed and duly emphasized this wonderful fact; for the statement of it is one of the three fundamental axioms on which his whole system is founded. He calls this axiom "the sameness of indiscernibles," which he interprets, in a somewhat paradoxical manner, to have just this meaning: that no two things can so resemble each other as to be indiscernible; for if they were, they would no longer be *two* things, but one and the same. The illustration that he employed while discussing the subject in the presence of the Princess Caroline, as they were walking in a garden together, was that no two leaves precisely alike could be found on any bush. Another gentleman who was present took up the challenge, but after a long search, was obliged to confess that the statement of Leibnitz was probably correct. A better illustration, as it seems to me, might be taken from the human face. Here, all the differences are crowded together within narrow compass, say within the limits of six by eight inches, and all the main features—brow, nose, eyes, cheeks, mouth, and chin—are constructed essentially on the same general pattern. But what a marvellous wealth of difference underlies all this uniformity! Among the many millions of human faces that people this earth no two can be found so nearly alike but that they are easily distinguishable at a glance. Once in a great while, indeed, a case of disputed

identity comes before our tribunals of justice; but if there is no better ground of dispute than there was concerning the Tichborne claimant, tho the genuine Sir Roger had not been seen for over thirty years, the jury would very quickly come to a verdict. Those who failed to see that Orton was not Tichborne had marvellously short memories.

How the followers of Tyndall and Huxley are able to reconcile this measureless variety in nature with their theory, that all living things are turned out by machinery on purely mechanical principles, is more than one can easily imagine. They hold even that thought, that wonderful psychical process which generated the poetry of Milton and the science of Newton, is only the necessary mechanical result of the molecular changes of protoplasm. As the stimulus of an electric spark, they say, causes hydrogen and oxygen to unite into an equivalent weight of water, so the stimulus of preëxisting living protoplasm causes carbon, hydrogen, oxygen, and nitrogen to generate an equivalent weight of other living protoplasm. There is no other reason for attributing a new entity, *vitality*, to the protoplasm thus produced, than for ascribing as a new entity, *aquosity*, to water. As it is by its mere chemical and physical structure that water exhibits its aqueous properties, it is also by its mere chemical and physical structure that protoplasm exhibits what are called its vital properties; for instance, that it generates, *inter alia*, nerve substance or brain, and the brain thus formed generates its infinite wealth of thought. In short, this theory reduces psychology to physiology, physiology to chemistry, and chemistry to the mechanical action of molecules upon each other; in other words, the whole series of intellectual and vital processes is accounted for as the continuous and uniform action of a self-generating machine. But if the brain thus becomes comparable to a large printing-office, that is worked by machinery throughout, then I insist that the types must perfectly resemble each other, because struck from the same matrix, and one printed sheet must be indistinguishably like every other which has been impressed on what the printers call the same "form." But the fact is far otherwise. The types set up to furnish imprints of the human face divine never, even by accident, produce two impressions exactly alike. The thoughts printed on two brains at

the same time and under the same circumstances, or on the same brain at different times, are diversified and individualized beyond all power of computation. Life and thought, as thus infinitely varied, cannot be the results of machinery.

Now I say that this measureless variety of tint and outline, with which nature individualizes all her living products, is the necessary means of enabling experience to do its appropriate work. Only because every living man and animal is what the Scotch call *kenspeckle—i.e.*, easily recognized—can any one of us profit by the lessons of the past as a guide to the future. Thus only are we enabled to select appropriate means for definite purposes and ends. Thus only can we distinguish our friends from our enemies, him whom we may safely trust from him whom we must beware of, our food from our poison, my own child from a stranger to my blood, an explored country from a trackless waste. The whole fabric of civilized society may be said to depend upon the possibility of giving testimony on oath, that this particular man stole this particular horse. In other words, discrimination is necessary, and this, as we have seen, is the essential and distinctive element of human thought.

But the question immediately arises, What substitute does the brute possess for this peculiar endowment whereby the human mind is made capable of doing its necessary work, and thereby of providing for self-preservation and all the manifold exigencies of its life? Such a substitute there must be. Man is enabled to provide for his wants only because he can profit by his own experience and that of his fellows; while the brute, as we have seen, is not made one whit the wiser by any amount of experience, because it cannot properly distinguish one case from another, or discern the comparative faults and excellences of two of the same kind. How, then, can it preserve its life and perform its ordinary work? The answer to this question brings us at once to the heart of our subject, as it shows that the greatest difference between the human and the brute mind is not one of defect on the part of the latter, but rather of an excellence, since it is the exclusive possession of a faculty which so far transcends the power of human reason that, in its most common manifestations, it appears inscrutable, miraculous, and even divine. So far as the lower animals are guided by it—and

they are all more or less under its control and dependent upon it—their actions appear to us not as subhuman, but as superhuman. Instinct is inspiration; even Kant says of it that "it is, the voice of God." The only adequate definition of Instinct is that it does all the work of experience without any aid from experience, so that man can only wonder at, but cannot understand, its operations.

It is a curious and instructive fact, that we have no one word in the English language to express what the French call *clairvoyance* and the Germans *Hellsehen;* that is, the assumed power of knowing more than experience ever taught, or is even capable of teaching. I say this is an instructive fact, because it indicates that practical and incredulous turn of the English mind, that large and roundabout common-sense, which recoils with aversion from all idle tales of seeing into the future without any aid from the past, or perceiving by immediate intuition what is obviously beyond the range of the senses, and generally of accomplishing any feat which transcends our ordinary human faculties. We have not the name, because we do not believe in the thing. The French, and especially the Germans, are more fond of the marvellous, and more prone to accept it on insufficient evidence. The Scotch give to the power in question the name of "second-sight." The nearest approach that we can make to this meaning in English is our word "seer," or prophet, denoting one who

> "can look into the seeds of time,
> And say which grain will grow and which will not."

It is the power attributed by the vulgar to witches, demoniacs, somnambulists, and magnetized persons, but which no educated and well-balanced mind is capable of believing that they actually possess.

Now I affirm that this very marvellous faculty of *Hellsehen* or *clairvoyance*, which no sensible person believes for a moment that any human mind has ever manifested, at least for the last eighteen centuries, is unquestionably possessed in high perfection by many, if not most, of the lower animals, under the name of Instinct, and even by those who are as low down in the scale as the fishes and the insects. I might take as a familiar instance

the often-cited case of a kind of wasp, which stores up food of a sort which it never uses for itself, for the future sustenance of its young, whom it is never to see, because its own life ends before theirs begins. This case is instructive, because such prevision, confessedly beyond the range of the animal's individual experience, seems also to be inexplicable even by the aid of Mr. Herbert Spencer's ingenious supplemental theory of the accumulated effects of transmitted ancestral experience. But as the heroic imaginations of the evolutionists, which are not to be appalled by many difficulties so long as an opening can be forced through them by any suppositions however violent, do attempt to explain away such wonders by the combined influence of heredity and natural selection—as Mr. Darwin does, for instance, in respect to the transmitted instincts of the working neuter bees—I will take another case of instinct, which is undoubtedly independent both of individual and ancestral experience. I refer to the marvellous power, which many animals unquestionably possess, of finding their way home or to their proper point of migration, unaided by their previous explorations. The stories seem to be well authenticated as to the possession of this remarkable instinct even by mammals, such as the dog, the cat, and the donkey, which have been carried away by sea for a great distance, and have then found their way home overland, unguided, by a route never before traversed by them or their progenitors.

Migratory birds, including many who were hatched during the very season of their departure, wend their way twice a year through the trackless fields of air to far-distant regions with so much precision that one writer supposes them to possess an instinctive knowledge of the cardinal points of the compass. The carrier-pigeon, removed from London to Paris in a basket, so that it cannot observe the surroundings, and whose limited vision certainly cannot see the end of its journey from the beginning, even if the curvature of the earth were not in the way, immediately on being released flies straight and swiftly to its former home. But men living in a sparsely settled country, or in the neighborhood of vast forests, have lost their way and died of exposure and privation, tho distant only a few miles from their own doors. Bee-hunters in our western country are

able to track the ordinary honey-bee to its distant hive, because its instinct teaches it to fly home in what is called "a bee-line;" that is, in one mathematically straight. Two of them are caught, and then separately released at points a few rods distant from each other, their several lines of flight being accurately noted; where these two lines intersect, generally in a hollow tree at a distance of one or two miles, the hive is found. This precision of flight cannot be explained by the insect's sharpness of vision, or by the elevation at which it flies; for the hive may be in a thick forest, so that the intervening trees hide it, if one is but a rod or two distant in any direction.

It must be still easier, and more hopeless, to lose one's way in the unexplored depths of ocean, than even in a vast forest or a trackless desert. Here are no furrows or water-marks, and no possibility of vision beyond an extremely limited distance; all must be a vast expanse of blinding uniformity. Yet migratory fishes, like the salmon and the shad, after wandering through the ocean during the whole winter, return with unerring precision, when the breeding season approaches, to the very rivers which they left months before. The recent success of pisciculturists in stocking with the ova of these fishes distant streams never before frequented by them supplies more proof, if more were needed, that no store of inherited experience can supply the needed road-marks and guidance. A familiar knowledge of the Tweed and the Shannon will not help the salmon fry to find its way at the antipodes, in the rivers of Australia. The human navigator, tho aided with compass, sextant, chronometer, chart, nautical almanac, and other instruments and records of systematized experience, directs his voyage with difficulty over the ocean surface, tho his vision there extends for leagues in any direction. The salmon, guided only by instinct and with no aids beyond the organs of its own body, follows its course far below, through the dimly lighted depths of waters, with even greater security and precision. For it is a characteristic of instinct that it never hesitates, wavers, or doubts; and it makes no mistakes. Instantly, without stopping to think—for indeed it is incapable of thought—and however protracted and complex its task may be, it does just the right thing at just the right moment.

In fact, every undoubted case of instinct involves the exercise of this mysterious power of *Hellsehen*, or "second-sight;" for its nature is to make laborious provision for exigencies that are still in the comparatively remote future, and of which the animal has had no experience whatever. The bird not yet a year old, how does it know that the cares of maternity are coming upon it, and must be met by the construction of a nest of which each species has its distinctive pattern? Properly speaking, of course, the animal does not see into the future, its vision being strictly limited to what is before it at the present moment. But its actions and endeavors are as wisely regulated as if it had far more than human foresight. Instinctive action is working for a purpose without any consciousness of that purpose. That purpose is an all-important one, either for the continuance of the animal's own life or the propagation of its species. The long-continued and laborious work that is done for this purpose is usually distasteful for the moment, involving a considerable sacrifice of the creature's present ease and enjoyment. But urged by an impulse stronger than death, it lifts the self-imposed burden and bears it stoutly to the end, uncheered even by that which is the great solace of all human labor, the hope of future happiness which is to reward the performance of duty. The action of instinct bears some resemblance to what man does under the influence of habit, his work having become a mere routine, which he performs without reflection and almost without consciousness. But habit is not instinct, for it is slowly generated and perfected by experience; while instinct, perfect from the moment of the animal's birth, is altogether independent of experience.

Instinct is certainly given to the brutes as a substitute both for reason and for experience which supplies the materials on which human reason operates; and, in truth, we know that the two faculties exist in inverse ratio to each other. As at the bottom of the scale, in the lowest animal, there is certainly no trace of reason, so at the top, in man, there is no vestige of instinct. In the human being, it is true, we find natural and primitive emotions and appetites, which are often loosely called "instinctive." But they do not deserve the name, for they dictate only the end to be pursued, but do not guide us, as instinct

would, in selecting the right means for its attainment. On the contrary, the stronger the feeling or desire, too frequently are we the more mistaken in our eager attempts to gratify it, which often defeat the very purpose we have in view. Instinct does not commit such blunders. I have already alluded to the fact, that the highest and most marvellous instincts are manifested far down in the scale, among ants, spiders, and bees, and are comparatively infrequent among the vertebrates. But even here birds show more numerous and more complex instincts than mammals, and fishes are guided more by what answers to inspiration than by habit. Hence, as Prof. Mivart remarks, the more instinctive a man's actions are, the less are they rational, and *vice versa;* and this amounts to a demonstration that reason has not, and by no possibility could have, been developed from instinct. "When two faculties tend to increase in inverse ratio, it becomes unquestionable that the difference between them is one of kind." This is the case with respect to sensation and perception. Both Dr. Reid and Sir William Hamilton have noticed the fact that, as the sensation becomes intense—looking at the full blaze of the sun, for instance—the cognitive perception of shape, color, and other attributes diminishes; and conversely, as the perception becomes more distinct, the mere sensation fades out into indifference, and no longer gives either pain or pleasure. This is the case in reading a printed page, where the cognitive faculty comes into play almost exclusively, and the mere visual sensations of black figures on a white ground are hardly noticed; we are absorbed by the thought and disregard the symbols. We have here one instance of the opposition between mere feeling, which is a purely subjective state of mind, and the objective cognition of rock, tree, or water. In fact, perception proper is a rational process, which needs the aid of the understanding or thinking faculty in order to compare, discern, and judge, and cannot be completed without it. The brute merely stares at a novel object, and does not properly take it in or understand it. He has sensation from it, but no proper perception of it. But man, tho perhaps seeing the object for the first time, still in a certain degree *re*cognizes it, or knows it over again, saying, "This is a tree, or a house." Judgment, a purely intellectual act, of

which the brute is incapable, is involved in every act of perception strictly so called.

The instinct which guides the ant and the bee is really the same with the power or agency, call it what you may, which directs the physiological processes that paint the peacock's tail with so complex and gorgeous a pattern, and arrays shells and flowers in their decorated holiday garb. Indeed, the process of development through which the whole organism is built up on a complex but definite plan, with its machinery of limbs, muscles, joints, and nerves, and its adornment of plumage, shell, and scales, is but half of the work necessary to be accomplished before the animal is fitted to play the part assigned to it in nature's scheme, and thus to preserve its own life and continue its species. Together with the organs and other physical means of doing its work, it must have the knowledge and skill requisite for making the proper use of those means, and directing them towards the appropriate ends to be accomplished. The instinct and the organism in which it is lodged are thus necessarily related to each other as parts of one whole; any change in either of the two factors would incapacitate the animal for its task, if it were not accompanied by a corresponding change, nicely adapted to it, in the other. Thus, in the spider, the gland which secretes the viscid fluid, which is the raw material for constructing the web, must be correlated with the instinct for drawing out the threads and weaving them into the peculiar pattern of that web; and both these processes, again, must be nicely correlated to the general purpose in view, that of entrapping its prey. Webbed feet and plumage impervious to wet must be correlated with the instinct to take to the water and swim; as is clearly seen in the case of ducklings that have been hatched out by a hen, as in this case, the instinct cannot have been acquired by instruction, experience, or imitation. Many birds instinctively hide their nests both by building them in crevices and corners not exposed to open view, and by assimilating them to the color of the surrounding rock or foliage. In like manner, the agency, whatever it may be, which constructs the animal's organism often provides for its protection through concealment by similar means, as by assimilating the color of its skin or plumage to that of its surroundings, or by mimicry of forms of a different nature; for

instance, by imitating the color and external structure of a dead leaf. Even man has an involuntary and almost unconscious impulse to imitate actions in which he is much interested, as when we cough or yawn by contagion, or writhe and twist our bodies in sympathy with the rope-dancer whom we are gazing at. Reasoning from analogy, then, we may well conclude that it is an imitative impulse, tho a wholly unconscious one, which gradually assimilates the insect's color and external form to a dead leaf, or some other shape seemingly so fantastic that it appears like a purposeless freak of nature. But then we must also admit that the ordinary process of building up the animal's whole body in the normal way, after the common type of its species, is throughout the animal's own act, tho a blind and unconscious one, performed under the guidance of a higher power. It is not the brain which generates the instinct, but it is the instinct which constructs the brain, as well as every other portion of the organism.

FRANCIS BOWEN.

THE REFORM OF WOMEN'S EDUCATION IN GREAT BRITAIN.

THE last half-century—perhaps the most progressive that the world has ever seen—has not only been distinguished by a rapid and extraordinary series of discoveries in science and by the enlargement of men's minds in many directions of philosophic thought, but has also brought about certain revolutions of social ideas, and that, too, in old and conservative countries, such as Great Britain. Among these bloodless revolutions may be reckoned a change of idea, which, if not yet universally adopted, is in a fair way of becoming so, as to the kind of education to be given to young women of the middle and upper classes of society.

In regard to this matter a movement has been going on for some time, with marked results, and it may be not unacceptable to American readers if we summarize the changes which are being introduced in Great Britain, and at the same time offer some remarks or conjectures as to the ulterior results to which they may lead. Till recently there was no attempt to give girls any "secondary education" at all, in the proper sense of the term. "Secondary education" of course means education which, rising above primary instruction, is still preparatory to something further—which prepares the mind for the higher or university education. Now, we may safely say that, as a general rule, this kind of secondary or preparatory culture has in the past almost entirely been denied to girls. America doubtless took the start of England in these things; but looking either to the best home education for girls in England or to the highest "finishing schools" thirty years ago, what we find provided is, not secondary education, but pri-

mary instruction overlaid with accomplishments. Primary instruction, however, is in itself no education, it is only a means to the subsequent attainment of education; and accomplishments are no education for the mind, they are like the "three R's," mere *fähigkeiten*, as the Germans call it, mere capacities of doing something with the hands or the voice, useful or elegant tricks which are acquired without development or training of the mind. And if all this be in the main true, then the old-fashioned course of female teaching must be said to have launched women uneducated into the world. It left them to pick up intellectual education for themselves, as they best could, out of life itself.

All this time there existed the strongest contrast between the schools for boys and those for girls, in respect both of aim and method. The English grammar schools for boys for a long period aimed almost exclusively at thoroughness of grounding in the classical languages. They comparatively ignored everything else, and the reproach against them was that they spent too much time in digging the foundations. They taught as if boys were going to live to the age of Methuselah, and were going to spend their first hundred years at least at school or college.

With girls throughout Great Britain the exactly opposite plan was adopted. Having learned to read and write, they were taught French as an accomplishment, not as a study, and the result, in most cases, was that, with very little cultivation of the mind, they acquired a sort of courier's facility of using this and perhaps other modern languages. Not only language, but also art and science, were turned into accomplishments. Music was made mechanical, and was taught rather to the fingers than to the mind. Drawing became a trick of copying other people's copies of nature. Science was robbed of all that was scientific, and was handed over in the shape of a collection of facts, to be acquired by the memory. Thus, girls' education, while covering a much wider field than that attempted in boys' schools, and aiming at a much more immediate and practical preparation for life, unfortunately eliminated all that is really intellectual out of teaching, and thus debilitated the mind of the pupil, whom it often turned out greatly incapacitated for further acquisitions of knowledge. The boy, on the other hand, if he had really

worked hard at his Latin and Greek, and especially if he had had the good fortune to be taught some mathematics besides, commenced life exceedingly ignorant of many subjects which it was desirable for him to know, and yet he was regarded as a cultivated man, and was found to possess a faculty of acquiring afterwards almost any subject to which he might have the energy to apply himself. These were two extreme systems, and doubtless each required to borrow something of the other. But we are not concerned at present with the improvement of boys' schools; the question before us is, What reforms were required in the old-fashioned (and indeed not yet superseded) English girls' school of thirty years ago?

Among such reforms any addition to the hours of school-work was certainly not included. On the contrary, what was imperatively called for was less work well directed. It is really saddening to think of the immense waste of time and labor, the dreary hours, the incessant joyless treadmill, which characterized the girls' school of the past. Most of us know instances of ladies whose health has been impaired by the penal servitude of their school-days, with the result that all the time they learnt hardly anything, and the only wonder about them is that after all they have turned out as well as they have done. Conscientious incompetence on the part of the teachers led to a perpetual violation in girls' schools of the laws of mental progress. Who does not see on reflection that we learn best when there is a certain joy attending the act of learning, and that this feeling of joy, this thrill of interest, this pulsation of the inner life, it should be the object of the educator to inspire or evoke? But if there should be joy attendant upon the act of acquiring knowledge, this must be no mere passive pleasure; the mind requires at the same time to be roused to energy and effort. Thus there is another law of mental progress which has been well expressed, as follows: "The development of an organism proceeds from its activities rather than from its passivities," and that, if this be applied to the mind, it follows that "the first condition of mental development is that the mind should be creative rather than acquisitive," and that "no amount of erudition or acquisition of any kind can absolve the mind from the necessity of creating, if it would grow."

These two laws—the law of Joy and the law of Energy—are obviously laws of life. They presuppose that the mind is a living organism, capable of expansion by its own activities and its own growth from within, capable of being repressed and stunted by habits of passivity and inaction. Whereas in the girls' schools the mind is looked upon as if it were an inanimate empty receptacle, into which as many articles as possible were to be crowded, in the hope that they would come out when wanted. In comparison with this procedure the much-abused Latin verses of boys' schools have something to be said for them. They, at all events, put the mind into a creative attitude; they teach method and taste, and many things besides. Of course this might be done in other ways, but many men, when they look back on their school-days, may feel thankful that they were made to spend a great deal of time in making Latin verses, instead of spending the same amount of time in acquiring the "useful information" so much prized in ladies' schools. In girls' schools, for the most part, there has been an idolatry of facts, dates, names, and the like—these being looked upon as safe and useful acquisitions, a sort of portable property which would at some time surely become of service. The acquirement of these has been made a substitute for mental exercise and training. What one asks for from Education is, "Give me myself; give me myself awakened, strengthened, made generally available." But the old-fashioned girls' school says, "No, I will not give you yourself; that might be imprudent. I will give you lists of kings, rows of dates, botanical orders, plenty of hard names; in short, an extensive *répertoire* of words." But there is another peculiarity: what the old-fashioned girls' school idolizes is dead facts. If facts have any life in them, the girls' school takes it out. History and geography are of course full of facts, and very vivid facts too, if looked at in a natural way. Naturally treated, these studies cannot be otherwise than fascinating to the youthful imagination. Geography is a series of pictures. History (in its elementary form) is a succession of romantic tales. Experience shows that even very young children take pleasure in a map when you show it to them and talk about it, and children of all ages listen with interest to the narratives of history when told to them in a conversational manner free from the dry

formality of books. A teacher conversing to a class about a map exhibited before them may mingle history with geography to the advantage of both, or may dilate upon the physical aspects of nature, and in a hundred ways may awaken an interest. To awaken an interest ought to be the real object of school-teaching; and to this end the teacher himself should acquire beforehand an interest in what the pupils have to learn. The girls' school method of dealing with history and geography is the reverse of this, and is really deplorable. Instead of beginning with a map and a lively conversation, the old-fashioned teacher requests the unfortunate pupil to "prepare" (that is, to learn by heart) one or two pages of some dry manual, containing a list of the Chinese rivers or of the Merovingian kings, or, in short, matters no doubt interesting in themselves but with which the pupil feels as yet no possible concern, and which therefore appear like mere hateful abstractions. What is learnt in this way can hardly be retained in the mind, and the time spent in this sort of study is to a great extent time wasted, being spent in a violation of what we have ventured to call the law of Joy—namely, that the mind can only profitably take in and assimilate those things which it seizes upon with pleasure.

The opinion has been expressed that "the thing which is wanting in women's education is not the acquaintance with any fact, but accurate and scientific habits of thought, and the courage to think that true which appears to be unlikely. And for supplying this want there is a special advantage in geometry, in that it does not require study of a physically laborious kind, but rather that rapid intuition which women certainly possess; so that it is fit to become a scientific pursuit for them." Fully admitting the probable truth of this remark, we would only point out that the writer of it confines his attention to the production of a scientific intellect. But there are many women, just as there are many men, who seem not born to have a scientific intellect; and indeed there are other kinds of intellect, besides the scientific, which have great value in the world. What the reformer in these matters would naturally plead for is that education should develop a woman's capacities whatever they may be, whether scientific, or literary, or artistic, or practical in the highest sense. Whereas the old-fashioned girls' school

system seemed calculated rather to impede than to assist any development of this kind.

One of the earliest reforms was the establishment of Queen's College, London, the idea of which was that it was to be for young women, what King's College was for young men, namely, a high-class secondary school with a university department.

For the first time the course of study for girls was made as far as possible the same as that for boys. This idea could not be carried out completely all at once. But now it has been so; and Queen's College, now numbering 400 students, makes the very difficult examinations for matriculation and degrees in the London University the goal at which its pupils are to aim. The foundation of this college, which obtained a royal charter in 1853, was the first important victory of the woman's cause in England, and it has led to subsequent advances which have succeeded each other with remarkable rapidity.

The first steps of the movement were the most difficult, and of course there was abundance of prejudice and theoretical opposition to be encountered. The purport of the great "button and slipper argument" of that period may be presumed to have been that, if a woman were once permitted to know Greek plays or astronomy, or in short to nibble at any side of the apple of knowledge, there would be an end to her sewing on buttons or working slippers. The conclusion was indeed terrific. But the argument itself was, to say the least, uncomplimentary to the women brought up under that very system which the argument was used to support and conserve. For it implied that the best women of the unreformed period of education were perfect and adorable wives only because none of them had "a soul above buttons," only because they had no interest in anything more intellectual than the most petty domestic details. The argument then was an insult to the past. It ignored those cases (with some of which many of us are happily familiar) of women with the finest mind, not well educated, but with a genial interest in literature and art, and in the results, if not in the methods, of philosophy and science, whose chief characteristic yet seems to be a noble altruism, and the welfare of others their primary object.

It is to be feared that neither frivolity nor ignorance is a

good safeguard against selfishness, whatever other advantages those qualities may have. It is all a matter of character, and it seems a strange thing to suppose that a knowledge of things lovely and of good report should have a tendency to deteriorate the character. The same thing may be said about the idea that high education will turn out nothing but "blue-stockings." A recent writer has well remarked that it is not the learning which gives a "blue" tint to the character, it is the character which gives a tint to the learning. On the whole, however, the obscurantist arguments have been pretty well lived down in England and the opponents of educational reform for women have become greatly silenced.

Subsequently to the establishment of Queen's College, London, four great steps may be signalized in the forward march of the movement. The first of these was the opening of the Cambridge University Local Examinations to women in 1865. The second step was the foundation of Girton College, which practically may be looked upon as a permanent university for women; and the idea of which is that it shall run exactly parallel with the neighboring University of Cambridge, with exactly the same studies conducted under the guidance of tutors and professors from Cambridge, and with identically the same examinations as those held for the Triposes in classics and mathematics, to test the proficiency of the lady students.

Next there came the establishment of the "National Union for the Improvement of Women's Education." This society, which enrols among its members many distinguished names, performs in the first place the general function of stirring up an interest in the subject, which it does by means of a monthly magazine. And besides this it has made a special contribution to the cause by sending out an offshoot in the shape of a company (limited) for the formation of higher-class proprietary day-schools for girls. By the action of this company fifteen such schools have been established in different large towns of England. Commercially the company has been a success, as it pays a dividend of 5 per cent on its shares, and educationally it has done good service by pointing out a great want and showing how it may be supplied. Already the example is being followed, and schools in imitation of the company's school are being set up elsewhere. The fourth

great step was the opening of the degrees of the London University to women, on the same terms as to men.

Thus in the battle for a thorough and suitable education for women, certain principles have forced their way which seem likely to maintain their position and to gain ground until they are universally recognized. They are: first, that the secondary education of girls should be made a reality—in other words, that it should be assimilated to that of boys; second, that the education of women should not necessarily be cut short at the age of eighteen—in other words, that something like a university education should be provided for women.

The University Local Examinations will improve the schools, and they will also be of great service in providing a goal for the home-education of girls. It is already evident that they are highly appreciated in this respect. Without laying too much stress on the certificate obtainable in these examinations —which, after all, only testifies to a moderate amount of attainments—parents must be glad to have a means of knowing that there is some result, at all events, for the money they have spent on the home-education of their daughters; governesses must be glad to have a testimonial to the reality and success of their instructions; but, above all, it is the greatest boon to home-bred young ladies to have something definite to work for, and to have a little innocent excitement introduced into the monotony of school-room hours. The examination system is often decried from an elevated point of view, as interfering with the disinterested pursuit of knowledge for its own sake. But experience shows that this disinterested pursuit is rare, and that ordinary human nature requires a spur.

In the lists of the successful candidates there is appended to their names a mention of the place or manner in which each has been instructed. On looking at this record one sees many candidates (and those by no means the least successful) entered as "corresponding students of (such and such) classes." This points to another new feature of our times—education by means of correspondence. It was a very good idea that persons living at a distance from schools, universities, and teachers might yet by correspondence obtain the means of improvement and cultivation. This idea has been well worked out in several places,

and especially so in Edinburgh, where a central committee of ladies receives the names and fees of those who, living at a distance, wish to become "corresponding students" in preparation for the University Local Examinations. By this committee qualified masters are employed, who weekly send out to the corresponding students papers of questions, and who return the answers revised and annotated with critical remarks and advice to the student as to her course of study. Here, again, we have the advantage of an external stimulus. Southey used to say that a breakfast-table did not seem complete unless there was a proof-sheet lying upon it, and one can fancy something of the kind being felt in many a far-off country-house or secluded manse, where the most interesting morning of the week is that on which the revision of the daughter's work comes back by the post and lies upon the table.

We have spoken hitherto only of the new appliances for the secondary education of girls in Great Britain. But there have of late arisen many colleges and institutions in which young women may obtain a university education. The most thorough-going, perhaps, is that of Girton, in which the ladies reside and receive exactly the same education, and are subjected to exactly the same examinations, as the candidates for honors in the neighboring University of Cambridge. As a matter of fact, we believe that no Girton lady student has achieved first-class honors, but several have reached the standard of men who come out second class in the very arduous examinations in Latin and Greek or mathematics. A different and milder species of institution, with similar objects in view, is the "Edinburgh Association for the University Education of Women," under whose auspices the professors of the university, in their leisure hours, give courses of lectures to women, in a building provided for the purpose, on all the subjects belonging to the Arts Faculty, and on some subjects of science and theology besides. The Edinburgh University then grants certificates, with or without honors, to women who, having previously passed the Local Examination (certifying to their sound secondary culture), pass in the subjects of any three courses of lectures. This system allows a free choice of subjects to young ladies.

There are some advanced and pushing supporters of the woman's cause who are by no means satisfied with the arrangements hitherto made in Great Britain for the university education of women. They are dissatisfied simply on the ground that separate establishments have been created, instead of the already existing male universities being thrown open and mixed classes set up within them of young men and young women together. Things will never be well in the opinion of these theorists till all the classes in the time-honored universities of the country are open without distinction to men and women alike. These people, however, seem to advocate mixed classes for the sake of mixed classes, or, at all events, for the sake of the victory which, by their establishment, would be gained over the prudish opponents of such innovations. For it is not pretended that in the separate colleges or classes instituted for them women get inferior instruction; nor, on the other hand, is it clear what advantage to women there would be in allowing them to qualify for the inappropriate degrees of bachelor of arts and master of arts.

The Government of Canton Zurich took just the opposite view when appealed to some years ago to admit women to university teaching. They replied that if they could have afforded it they would have provided separate classes for them; but that, as this would be too expensive, they would allow any young women who liked, to attend the university classes and get on there as best they could. This, one would have thought, is the true philosophy of the matter; for while it would seem better and more natural that young men and young women should be kept separate during their university studies, still, if it were found impossible to institute separate classes for women, then as a *pis aller*, we might concede that the universities should be opened to women. In Germany the system of mere dictation and note-taking is prevalent as a means of university teaching, but in Great Britain we expect a constant calling upon the students and putting them through their facings, with a lively rivalry among them for distinction in this process. And the question is how such a system could be carried on in a mixed assembly of lads and lasses from eighteen to two-and-twenty years of age without a rude effacement of feelings which are

the delicate bloom of civilization. In a word, were such mixed assemblies, keenly bent on the business and rivalry of education, made universal, would not woman lose her prestige and become common in the eyes of men? This is a question to be answered by experience, and America has already a considerable fund of experience with regard to it. In Scotland it seems to be pretty clearly established that mixed secondary schools for boys and girls are a mistake, and that in a mixed secondary school you will never find either a first-rate girls' school or a first-rate boys' school. A mixed system does well enough in a primary school for young children; in a secondary school it begins to be highly disadvantageous; for young persons of university age it would seem to us to be only suitable among those societies of angels where, as poor Mignon said, "Sie fragen nicht nach Mann nie Weib." This opinion and belief, however, may, after all, be mere superstition and prejudice. Whether it is so or not time and experience will settle. In England an experiment in the matter has lately been begun by the throwing open to women of some of the arts classes in University College, London. As yet it is said that no inconvenience has been found to result, but a far longer trial and an intimate knowledge of the circumstances are requisite before one can accept such an experiment and allow it to influence one's judgment. In the mean time, wherever separate classes are practicable, those who look at the question merely from an educational point of view will probably desire that they should be adhered to, and that ultimately they should be developed into separate universities for women with their own proper endowments and encouragements for study. One would have thought that it was grounded in the nature of things that somewhat different methods of instruction and a somewhat different curriculum from those in vogue in male universities would be suitable for women. If so, it would surely be an educational mistake to apply to both sexes the Procrustean necessity of a uniform system. At first in England there was an excuse for founding Girton College on precisely the same lines as the University of Cambridge; for it was said that otherwise there would be no guarantee that young women could really do solid work and pass searching examinations. But this point has been now amply established, and therefore there is no longer any

necessity, merely for the sake of repelling a suspicion, to maintain an identity of method. The Women's University of the future is free to receive its own distinctive development.

But the enthusiasts and agitators are by no means content to take a merely educational point of view; what they aim at is nothing short of what they would call the complete emancipation of woman, both legally and socially. They would give, or restore, to women all the privileges and functions of men; and they seem to consider that this could be done without taking from women any of the privileges and functions which are at present peculiar to them. We have spoken of the last half century as being characterized by an extraordinarily rapid progression of thought. Perhaps out of all history the period which came nearest to it in this respect was the half-century at Athens, at the end of the fifth and beginning of the fourth century B.C., which culminated in the production of Plato's "Republic." To that immortal work advanced thinkers of the present day may feel inclined to appeal as exhibiting the view at which Plato had arrived—that the whole relations between the sexes should be remodelled, and that women should be trained up exactly in the same way as men and admitted to a share in the administration and government of the state. Those, however, who hail Plato as "a Daniel come to judgment" on the woman's question must be reminded that his scheme for the state has to be taken as a whole, and that, as a necessary condition for the opening of political functions to women, it required what may almost be called a nihilistic basis. It called for the abolition of private property, of marriage, of the family; and it placed the right of infanticide in the hands of the state. These conditions having been laid down, it proposed that women should join with men in the pursuit not only of arts, but also of arms, and, when capable of it, end their career on the board of philosophic rulers and guardians of the republic.

Plato starts from an almost Oriental undervaluing of the female character, and he argues in favor of common employments for men and women from the analogy of horses and dogs, creatures in whom there is clearly not the same differentiation of sex as has been developed in the human race. Above all, he wrote as he did from an inability to anticipate that idea of the

true grace and glory of womanhood which has been evolved, under the influences of the Gospel, out of the historic experiences of mankind. Plato's aim, in theory at all events, was to convert the state into a philosophical and ascetic brotherhood, and for this purpose to destroy individualism, abolish all family ties and affections, and eliminate the feminine element from the world. It is a question whether those who at the present day strenuously advocate the admission of women to the suffrage and other political functions, are not unconsciously working for that which Plato's theory deliberately aimed at—the destruction of the feminine element in society. The woman's rights people of course will not admit that such is the natural result, or the tendency, of their efforts.

The question of opening the learned professions to women stands upon quite different ground from that of admitting them to political functions in the state, for the enfranchisement of women is a step which would have to be taken all at once; and if that step were taken at the present day it would certainly be a tremendous "leap in the dark," whereas the admission of women to the professions would be a very gradual process, working itself out under the laws of supply and demand. Some professions are obviously more suitable than others to women, as, for instance, certain branches of the medical profession. Women are often, so to speak, very good "men of business," and sometimes very fair speakers; it would remain to be seen if any of them, after being duly trained for the practice of the law, could inspire sufficient confidence to induce people to trust them with the conduct of matters on which the possession and security of property would depend. For the present there appears to be no prospect of such an experiment being tried in Great Britain. With regard to the Christian ministry, there has been no proposal, as yet, to open it to women. In some respects this might seem surprising, because it is generally considered that women are eminently endowed with religious and moral feelings, and that they are peculiarly fitted for the ministrations of charity and the divine work of consolation. Probably delicacy, and perhaps even policy, may have restrained the advocates of the woman's cause from venturing upon sacred ground, where they might have found the churches banded against them. To

take a more secular point of view, the position of a parish or congregational minister is one of conspicuous authority, and a considerable alteration in the old-established relation between the sexes must take place before it can seem natural to push forward a woman into such a position. The Evolutionists of the present day inculcate the idea that nothing is fixed, but that all qualities and relations are made what they are by habits in the course of time, and may accordingly be changed by the same process. We learn from them, indeed, that long spaces of time are required for radical changes, and in Great Britain we feel confident that the relation hitherto existing between the sexes will not be suddenly revolutionized, tho many reasonable changes may be gradually introduced in a natural way and under the guidance of good sense.

A witty bishop once said, in reference to the old state of things, "Our girls are, no doubt, very badly educated, but our boys will not find it out." This saying merrily indicates the truth that that which is most charming and lovable in woman, as well as that which is highest and greatest, is something independent of accurate scholastic or scientific training. Nor do we suppose that improved educational systems will give us in the female sex anything more admirable than the noble women who in all ages have adorned society, and whose names, in the great majority of cases, have never been known to history or to fame at all. But as we do our best to improve boys' schools, without any hope that by so doing we shall produce minds to eclipse Aristotle and Newton, so we may well aim at reforming, and to some extent at remodelling, the education of women, tho we distinctly disavow any intention to supersede the feminine ideal of the past. Women will not, through improved education, become individually superior to the noblest women who have yet lived, and whose school has been life and its vicissitudes; and again, it is not the tendency of careful education to multiply geniuses—the "George Eliots" of the future will hardly be proportionately more numerous. But on the other hand, women will not be unsexed by education; they will retain, unless society loses its good sense, those feminine characteristics which are really above price in this world; and at the same time, by having greater advantages of intellectual

culture afforded to them, the general level of the sex may be raised, and women may individually gain something both in happiness for themselves and in the power of being useful to their fellow-creatures.

By all means let women have the best possible education. The result in the long-run can only be good. What "the best possible education" is may not as yet be absolutely determined, but perhaps we may take it for granted that it is to be an education having as its base and centre the same difficult subjects as those taught to boys, and with the same training or something analogous to it. Let women in their early youth study the great writers of the world, carefully, reverentially, and with scholarlike accuracy. Let them imbue their minds with noble thoughts clothed in the most perfect literary form, remembering always that *non multa sed multum* is the rule for education. This will be a good preparation for life and the best prophylactic against all that is frivolous and vulgar. Such a course will give strength, and will lead to yet further results. In the first place, the governesses of the future, if thus trained, will be far more competent for their task. Thus there will be a general benefit to the rising generation. Again, the added strength of fibre and independence of mind may open the way to many bread-winning opportunities for members of the female sex, in straitened circumstances, which will be an inestimable blessing to them. To those classes of women who are raised above the necessities of work, culture will afford an antidote against the worst enemy which they have to contend with through life—if they have not families to manage—namely, *cnnui*, or the sense of having nothing to do. Woman is born for sympathy, and without it must wither. But the spread of culture produces sympathy in intellectual interests. And thus the reform in women's education seems calculated to multiply and increase that sympathetic intellectual life in society which is one of the best blessings resulting from civilization.

ALEXANDER GRANT.

THE NEWEST ATHEISM.

IT not unfrequently happens that in a large family of active-minded children there is one who is conspicuous for energy of thought and a certain habit of direct and outspoken utterance, conjoined with a *naïve* unconsciousness and simplicity, which make him at once the terror and the delight of the household. He speaks out the family secrets with a charming and yet fearful openness of manner and bluntness of phraseology. He repeats with a perilous truthfulness the free remarks about the neighbors which are proper only to the family circle, and then only when young ears and prattling tongues are supposed to be absent. He applies to the conduct of casual visitors the axiomatic principles of a wise father or prudent mother with a fearful directness if not precipitancy of logic—with such utter heedlessness of place and time and age and sex as confounds the oracle from which the wisdom originally proceeded, and makes it resolve with inward groanings ever afterwards to be dumb.

The child may be gifted even to an almost preternatural degree. He may be fearfully clever. He may be acute and logical, plainspoken and witty, ardent and fearless, noble and brilliant; but for all that, rather because of these very preternatural gifts and this preternatural boldness, he is the *enfant terrible* of the household and the neighborhood.

The very select family of those who call themselves the Scientists of the present generation are of necessity very active and bright-minded. The members of this large household are constantly stimulating one another by their brilliant hypotheses and their daring adventures in the field of experiment and conjecture. They wax earnest in their manifold dis-

cussions, whether they agree or disagree. They are often—we had almost said always—subtle and acute, eloquent and bold in their expositions of favorite theories or their lofty flights of imaginative romancing. Scientific papers and debates and harangues are usually especially spirited and spirit-stirring. It is not surprising that in certain branches of this now very numerous and variously assorted family, especially those branches which delight to think of themselves as advancing to the very front rank of speculative daring, there should be more than one *enfant terrible* who distinguishes himself by exploits of speculation and daringness of utterance which astonish even the boldest of his compeers. Such a thinker and expounder was the late Professor William K. Clifford, whose somewhat extraordinary career and more extraordinary utterances are for many reasons worthy of careful consideration. Among these reasons the most important is not that he seemed to delight in paradoxes of thought and speech, but that his atheistic logic possessed him like an evil demon, shooting him along arrowy rapids and plunging him down abysses of denial into which most men shudder even to look. This daring and perilous logic was not so much his as it was the logic of his school. It was no narrow and personal idiosyncrasy, the result of temper and training. It was the consistent and outspoken reasoning of the atheistic materialism of the times which so many now call Philosophy, and of those specialized doctrines of nature and of man which are claimed to be alone worthy to be called Scientific. Were the principles announced in these lectures peculiar to Professor Clifford, they might be regarded as the products of an unusually intense and therefore a narrow personality. But they are *the axioms* of a large and ambitious and positive school of thinkers who differ from him only in that they cannot state them so forcibly or dare not state them so boldly as he has done. Were the reasoning an individual peculiarity of a singularly subtle and therefore an over-refined logician, it might be dismissed as the product of an intellect misled by the tenuity of its own deductions; but when it is discovered to be in no respect peculiar except as it is disencumbered of many superfluous and entangling lines of ratiocination, it is well fitted not only to attract our attention but to awaken the inquiry, If this

logic is so merciless, how can any escape being impaled upon its polished but cruel spikes? Were the conclusions only the daring and isolated bravados of a bold and paradoxical declaimer, or the extravagant flights of a fervid romancer, they might receive our astonishment, or our admiration, or our ridicule; but when they are regarded as the necessary consequents of a well-reasoned and coherent system held in common with the writer by hundreds or thousands of sober thinkers, and differing from them only in vigor and clearness and eloquence and daring, they are fitted not only to arrest the attention, but to hold it with earnest and steady gaze until the question is asked and answered: Are the premises sound from which these conclusions are deduced, or do the conclusions, so offensive and shocking as they are, prove of themselves that the premises must be false or only partially true?

The career of Professor Clifford was singularly brilliant and singularly short. He was born May 4th, 1845, and died March 3d, 1879. He was very early distinguished for extraordinary aptitude for the pure mathematics, being alike remarkable for subtlety of analysis, fertility of invention, and felicity of exposition amounting to genius in the highest and rarest sense of this term. At the age of twenty-six he was appointed Professor of Applied Mathematics in University College, London. Before this time he had plunged with passionate zeal into the discussions of modern speculation. As early as at the age of twenty-three he had accepted the doctrine of evolution in its extremest form and in its most daring applications. The then new and paradoxical positions in respect to space and the nature of mathematical quantity were hailed by him with glowing enthusiasm, and propounded with an ardor and ingenuity peculiar to himself.

Psychology, scientific induction, ethics, and theology were handled one by one with the same confidence, and the extremest conclusions in each were advanced with what seemed, to many, a defiant recklessness that savored little of the philosophic calm. At his death, which was premature but not unexpected, thinking men who believe in God and immortality held their breath and kept their thoughts to themselves.

A brief and most unsatisfactory memoir of his collected essays

and lectures, many of which had already been published, are all the materials by which we can judge of the man or estimate his philosophy. For the reasons already given, both deserve a considerate attention.

As we have already said, Professor Clifford was an extreme evolutionist, accepting the theory first under Mr. Darwin's impulse as a new creative principle in biology, then proceeding to use it in constructing psychology, and subsequently extending it under Spencer's guidance as a universal philosophy to explain every description of natural phenomena with their laws, *i.e.*, Mechanism, Chemism, Life, Spirit, Man—in short, the Universe—from which he formally and passionately excluded God, not only finding no place for the Self-Existent but demonstrating that philosophy not only does not recognize an unknowable God, but that it *knows* there is no God higher than Humanity or Man. At first he was a High Churchman, and as such had necessarily separated his traditionary faith from those intellectual processes which his scientific theories were constantly bringing into requisition. For a while he held as a positive tenet that religious truth could not rest on scientific proof, inasmuch as the latter requires probable evidence alone, while religion demands intuitive certainty. For a while he arrested his sliding steps on the slippery slope down which they were gliding, by finding in faith a positive insight, or a special religious faculty; but this he abandoned—when or how we are not told, but it is easy to see why—so soon as he had fairly accepted the dogma that every species of intuition is a growth of time in the cerebral structure. That at first he was extreme, not to say extravagant, in the applications of his theory to practical matters, and was in danger of exemplifying his new creed by applying the doctrine of growth by differentiation in some personal extravagances of *sans culloterie* in manners, if not in morals, is hinted by his biographer. This effervescence, as we are told, was soon over. This youthful tendency to differentiation seems to have yielded to the sobering or integrating influences of his environment. Under the sounder sense of his associates he was content to expend his enthusiasm in the propagation and application of his new theory in speculative applications which were sufficiently startling and paradoxical. Leaving the man for the present, to

return to him again, we will notice some of his philosophical theories as expounded by himself.

We begin with his theory of the intellect. This is explained most fully in his discourse "On Some of the Conditions of Intellectual Development." This discourse was prepared at the age of twenty-three, not long after he had given his complete adhesion to the doctrine of evolution in its wider and more thoroughgoing import. It flashes with the enthusiasm of youth newly kindled by a fresh discovery of wondrous promise. It reveals most distinctly and frankly the logic by which these new convictions had been reached. The Professor begins by reminding his hearers that their minds are constantly changing. New sensations, new impulses, succeed one another in rapid succession. The character also, which at first thought might be said to be fixed, is itself constantly undergoing a slow but certain movement. This is true even of that aggregate of changes in the character of generations of men which we call *The Spirit of the Age*. These changes, moreover, have a fixed relation to circumstances. All the influences which are used by a man with himself, his neighbors and his generation, proceed on the assumption that if circumstances change the character will change with them. This raises the question, When are these changes for the better, and when for the worse? How shall we answer this and other questions? The author suggests a method, founded, as he frankly owns, on "a certain analogy, namely, the analogy between the mind and the visible forms of organic life"! The plant *grows*, the animal *grows*, the mind *grows*. What is this feature called growth which is common to them all? Simply this, that in the changes which all experience, the old and the past, is not left behind, but is taken up into the new and incorporated with it. If, in this particular, growth is common to the organic and the spiritual, "may we not reasonably suppose that the laws of change are alike, if not identical, in the two cases?" This analogy, if analogy it may be called, is the only reason given by this brilliant Professor for accepting the hypothesis of evolution and including within it the sphere of life and the sphere of intellect. It is true he only accepts it as "a working hypothesis," but he accepts it with all the accessories which Mr. Darwin had attached to it, viz., the tendency to vary and the

struggle for existence, neither of which features necessarily belong to the single common characteristics of growth. The first leap would seem to be a long leap—from growth in a tree to growth in the mind—involving a changing and a change-recording structure; but what could justify a second leap to growth with a tendency to vary, and then a third to growth fixed by the pressure of environment, it is very difficult for a sober thinker to answer. And yet this young mathematical genius, who ought to be something of a logician, does not hesitate to dare each of these flying leaps in succession.

To a cool and considerate thinker it would seem to be transparently clear that in this so-called induction mere words or the metaphors out of which words are made are the cobweb bridges which are thrown over these chasms of thought; that the confidence with which the words *change*, *record of changes*, *growth*, *variation*, *reaction of environment*, are applied indiscriminately to a tree, an animal, and the mind in the same senses, when in many cases the similarity is most attenuated, is a very remarkable phenomenon in our modern scientific thinking. And yet upon the legitimacy or the illegitimacy of this confidence rests the conclusion that evolves matter and spirit, life and intelligence, affection and conscience, man and God, in a series of ascending spirals, that are dissipated into the unknowable.

But we have not yet finished Professor Clifford's maiden essay. He is not content with the analogies already referred to. Looking again at the changes in a tree or an animal, we find them reducible to three types, viz., *change in growth*, *change in structure*, *and change in function;* and as we look also at changes in the mind we find the same three types repeated, confirming our confidence that the law of evolution is applicable to both. We consider each apart as treated by our author, it being understood that we give his thoughts, not his words, the underlying rather than the outspoken logic; or to follow the old metaphor of logic and rhetoric, we give the clenched fist and not the outspread palm.

We begin with *growth*. Growth in a tree consists of increased bulk or bigness. It results in an access of particles or accretion of material by nourishment. Here the Professor allows himself

a slight digression, being led astray by the subject-matter. He gives a theory of the normal size and the finishing stages by which normal dimensions are attained, remarking that as a growing plant notoriously takes in nourishment through the whole of its external surface, the surface increases in a proportion continually inferior to that of its mass, till finally it is brought to a standstill and growth terminates.

What now is growth in the mind, and how do we reckon the law and limitations of its normal growth? How is the analogy made good which is looked for? If the mind were assumed to be a brain-mass, with so many cubic inches as its normal size, or with so many thousand brain-cells, as Professor Bain has so carefully computed in his "Mind and Body," all needing nutriment, then the analogy would hold. But Professor Clifford had at that time not advanced so far as this, but is satisfied with loosely treating the growth of the mind as identical with the "acquisition of new knowledge." Unconsciously adopting but not avowing the conception of Hume and J. S. Mill that the mind is a bundle or series of impressions, he reasons that as the mind gains new knowledge *the bundle* grows bigger and *the series* grows longer. Moreover, he reasons that as long as we acquire faster than we forget, *i.e.*, gain more ideas than we lose, the mind continues to grow. This may happen in infancy and childhood; but when we lose ideas as fast as we acquire them the mind has attained its normal size, for a similar reason to that which holds in a plant, as already explained. "The growth ceases as soon as this balance is attained. So that in this first law, you see, there is an entire analogy between the two cases." All which is more luminous than convincing.

We are taught, "in the next place, that the mind experiences changes of *structure;* that is to say, changes in the shape and arrangement of its parts." Parts of the mind are ideas. Arrangement of ideas we can form some idea of, but "shape" of ideas is a little too much for us to understand, and the author does not relieve us. Upon arrangement, however, he throws a little light. Ideas of different qualities never connected before are brought together "by the qualities being found to exist in the same object." Other ideas are newly connected by

new scientific relations, and so ideas are rearranged—by a process similar, we suppose, to that by which inorganic material is redistributed and gathered into organic tissue.

"Lastly, changes of *function* take place. Everybody knows how the mental faculties open out and become visible as a child grows up." Here the author stops. He has struck a new vein. He has not explained what a function is either in a tree or an animal. He has not shown how increase in size and change of structure in either involves the manifestation and the activity of new functions. Nor has he shown how a similar process takes place in the mind. Before the analogy which he seeks for can be set up between what are called functions in each, the nature of function should be correctly understood in at least one. Otherwise we reason in metaphors, we venture flying leaps from matter to spirit. The audacity of the jump or the applause of the spectators is not certain always to save the leaper from an ignominious souse in the mire. In the present instance the mire is a confused impression that ideas by increasing in mental mass, and rearrangement in mental structure, can somehow reappear in mental faculty, and that faculty in mind is analogous to function in a tree or an animal. The writer has plainly lost his head in the excitement of the leap, having begun with the recognition of ideas only and emerging after his plunge with the assumption of faculty as the consequence of growth.

And yet he seems very well satisfied. He picks himself up without knowing that he has fallen, and concludes "that the actions which go on between the individual and its environment may be reduced to the same three types, viz., of growth, structure, and function, in the case of the mind as in the case of any visible organism."

He next resumes a question which had already been suggested: What is a change or growth *for the better* in the organic and the spiritual? He finds that when an organism, whether a tree or animal, grows better, its parts "get more different" and "get more connected," *i.e.*, "the organism becomes more different from and more connected with the environment, and the organism gets more different from and more connected with other individuals," in these successive processes of differentiation and integration. Similarly the mind is developed from the lower to

the higher as its parts are separated and connected with another, as the mind itself is separated from and united with its environment, and as it is separated from other individuals and socially united with them. The parts of the mind are ideas. Ideas are confusedly blended when consciousness is undeveloped. Ideas are separated when light is distinguished from darkness, when one percept, and another, and another, is separated by sharp discrimination. They are united when any coincide within the same limits and come into a whole. These wholes are next discriminated from other objects previously discerned as ideas, and anon united with another into other ideals. Next one of these ideal wholes begins to drop off from the mind in which it had existed as an idea, and anon is united with the mind itself by the very act by which the mind distinguishes it from itself. It becomes "something outside of ourselves, a real thing different from ourselves," and yet as the number of the relations by which it is discriminated is increased, the more intimately is it wrought into the mind that discerns it. So true is this, the author waxes warm in asserting, that the more we discriminate nature into parts the more our minds are assimilated to nature, so that as we gain in the discrimination and unition of our ideas we grow into new faculties or new senses to beauty and truth. This is true of the individual and also of the race.

All this is very fine, and would be true were there not two oversights. First, the parts of a tree and an animal are not analogous to ideas in the mind. Next, let it be that these parts grow by these successive actions and reactions of separation and unition, the process of growth is not analogous to the several acts of discrimination and unition by which the universe of ideas is built up by the perceiving mind. Did the analogy hold, the ideas would repel and attract another in alternate rhythm just as do the particles of the tree and animal. The precise point in which the analogy does not hold is unconsciously expressed by Professor Clifford himself when he says, "This notion, then, of a thing being real, existing external to ourselves, is due to the *active power of the mind which regards it as one*, which binds together all its boundaries." Once introduce this notion of an active power of the mind and the analogy of its processes to those of the growing tree and the growing animal wholly fails.

Ideas do not separate and combine with one another as the parts of a tree or an animal, but the active power of the mass unites and parts them. We cannot say when we pass the line that divides the tree and animal, that the process of the self-differentiation and integration of parts is intensified into the feeble beginnings of the analysis and synthesis of ideas. But we are forced to say that the processes cannot be assimilated by the analogy proposed, and that there is no evidence that the one can be developed into the other by the combined action of inner variation or external environment, or by any known or conjectured physiological operation.

The Professor concludes his arguments with an exhortation to his hearers which is interesting for two reasons. It illustrates the revolutionary condition of his mind over the new-found doctrine of evolution, and it brings out a glaring inconsistency between the doctrine itself and the inference which he derives from it. The doctrine is, You are and you must be what your nature as formed for you is capable of becoming by the joint action of its tendency to variation and the holding and fixing power of its environment. The exhortation derived from this conclusion is, Cultivate variation, swell and sprout in every direction, try all kinds of experiments in odd ways, if so be that some lucky *sprout* may be caught and fixed by some favoring environment, and nature and yourself shall rejoice over the fortunate combination. This conclusion was all very natural for this strong-hearted and enthusiastic youth, who was rejoicing in the possibilities of the future and rejoicing also in the promise of his new-found gospel of evolution. The exhortation, too, was natural. It could with difficulty be repressed. It was only unfortunate as being inconsistent with the doctrine from which it was derived. For only as the mind possesses an energy of its own can it properly be exhorted and inspired to the exercise of its powers in the direction of individual activity. But inasmuch as all the energy in the case, according to the theory, rests in the ideas, we cannot see the propriety of any exhortation at all. Moreover, it would seem to the unsophisticated mind that the exhortation itself is properly a part of the environment to the minds addressed, and the sole function of the environment, so far as they are concerned, is to fix and favor or

to scatter and repress their tendency to variation. We conclude that the author must have forgotten the correct application of his new faith in the fervor of his exhortation, and reasoned as tho he actually believed in "an active power of the mind" as something other than the parts of a tree or animal in its functions and laws.

We have dwelt so long upon this brief lecture because it was the first exposition of the author's new philosophy, and the foundation-stone upon which he founded his new faith. For this reason, if for no other, it cannot but excite a special interest, and particularly inasmuch as he never changed or disavowed it in any essential particular. It expresses in brief also the statement and the argument of the doctrine of atheistic evolution. As such it is not distinguished for any special coherence of logic or felicity of illustration. It is, however, clear, outspoken, simple, and short. It contains the principal article of this creed and the substance of all that can be said in its favor. The author first endeavors to connect two spheres of phenomena, the organic and the physical, under a common relation, and to explain them by a common analogy—*i.e.*, of *growth*—which means *development*. If the analogy holds between these two disparate spheres, it may hold between spheres that are more widely remote. If it holds between a tree and the intelligent spirit of man, it may hold between nebulous matter and the poems of a Goethe and Shakespeare, and the affections, thoughts, aspirations that wander through eternity and connect man with God and immortality. If the movement here called growth is independent of freedom in man or design in nature, if it proceeds of itself by alternate pulses of variation and integration, then there is neither need nor place in the universe for God. So Clifford reasoned with such directness of logic as that with which the rifle-bullet speeds to its mark, and with the cruel shriek of exultation with which the bullet rejoices over its work of death.

Many professed evolutionists who adopt the same logic do indeed seek to stop short of these extreme conclusions. They find a place for spirit and for God in the plan of evolution itself, in the intricacies of the dependencies, and the energies of the forces, and the sustained length of time which the doctrine involves. We have no disposition to dispute at this point the sincerity of their faith.

We beg leave to call their attention to one point, however, and that is to the weakness and cloudiness of the analogies between the organic and the spiritual which theistic evolutionists accept, and the facility with which they accept this theory as what they call a "working hypothesis." This essay of Clifford is an intelligible example of what we mean. Acute and quick as he was and trained to all the subtleties of mathematical analysis, skilled, moreover, in the art of felicitous exposition, he is carried away by the double or triple sense of the term development, and stumbles into logical discomfiture for failing to discern the difference between the process of growth in a tree and growth in mental activity and acquisition. His example is not so peculiar as would seem at first thought. Development itself in any sense in which it is understood gives pause and wonder to our analysis. It is confessedly and notoriously explained by manifold theories of force, law, or purpose, one, two, or all which may be used to explain it. The scientist used to the precise terminology of science in vegetable or animal life, and unused to any sharp thinking or precise terminology in intellectual or spiritual phenomena, is easily tempted to accept metaphorical terms in a scientific signification, to adopt evolution as a "working hypothesis," and to proceed to work his reasonings and his conclusions by it as tho it were verified by facts. It were unfortunate for the scientist and for science and the logic of both if he should be discovered even to himself of making such fearful blunders as our *enfant terrible* has done in the lecture which he delivered with such exuberant and irrepressible confidence, and which his editor does not think it necessary either to explain or excuse.

Leaving the first lecture, we select, for the next of those which comes within our plan to consider, the elaborate lecture delivered in 1872 before the members of the British Association, "On the Aims and Instruments of Scientific Thought." This lecture is remarkable as being one of the most deliberate attempts to limit the sphere and the methods of scientific knowledge to the acts and results of simple sense-experience that has been put upon record during the present century. It carries us back to the bald and unsupported assertions of the school of Helvetius, in respect to the nature and methods of our higher

knowledge. It is written in serious earnestness, however, without the slightest strain of a frivolous or trifling spirit. The method is analytic. The author begins by asking what is scientific thinking. After a few preliminary efforts he answers at last by saying: 'It is the application of past experiences to new phenomena whenever such experiences have become sufficiently uniform and exact. There is, however, no absolute exactness in anything. All exactness is proximate. It is enough that the objects compared or measured go beyond our sense-observations and measurements. Pure mathematical quantities and their relations are fictions. So are absolute uniformities, in phenomena or operations. It is enough that we can detect no errors. The questions we ask must also be *reasonable*—and they are reasonable whenever we have at hand experiences such as have been described—that *are sufficiently exact and sufficiently applicable.*' To the questions whether there is anything beyond our experience which is irresolvable, absolute, or unknowable, it is enough to reply —As fast as we get new experiences and can apply them to new cases, we shall go on doing so. That is all that we can say, and with this we ought to be content. To introduce the ideal element of pure mathematical quantity in time and space in order to explain exactness or to assume adaptation or causation or analogy in nature in order to explain reasonableness, is gratuitous, inasmuch as we are limited to the single activity already described. We find ourselves acting in the ways enumerated, and by these methods we explain our existence, our modes of activity, our science, its aims and instruments, and have finally reached, as the formula which meets every case, the single uniformity or law which we call Evolution.

In passing over this lecture with this brief synopsis, we have left untouched a host of gratuitous, untenable, and inconsistent assertions. We hardly need say that the theory of scientific thought here outlined is insufficient to explain or justify any species of scientific activity or to sustain any kind of scientific enthusiasm. There is no need to say that such a philosophy of science is necessarily atheistic. Simple observation of the uniformities of sense or even of spirit, however exact or reasonable, could never raise the question, much less answer, Is there anything beyond the finite? The denial of causation and purpose

and geometrical quantity rules out any possible suggestion of a self-existent and Personal Intelligence.

We are forced to omit, for the reasons already given, the detailed expositions of Clifford's theories of physics and the extended explanation and vindication of his views of the metaphysics of pure mathematics, which are given in other lectures and essays. We pass to his essay entitled "Body and Mind," which was written in 1874, six years after the essay on "Mental Development," when the doctrine of evolution had become hardened in his mind into an axiomatic truth. No more rankly outspoken materialistic atheism could possibly be conceived than that which this essay avows and defends. The frankness of the avowal is, however, of little moment. We are solely interested in the arguments by which this double conclusion is reached. Professor Clifford begins by asserting that philosophy and science are only organized common-sense—that if more questions have not been settled, it is because the methods of inquiry are defective. Certain questions are no longer open; some may be presumed to be settled by scientific men, such as the possibility of squaring the circle. In like manner there are questions in respect to the mind and body which have ceased to be open questions because science has had her word to say about them. "And they are only open now to people who do not know what that word of science is and will not try to learn it." This sounds somewhat dogmatic and priestly. We look forward with curiosity to know what these questions are and how they are settled. We are not left long in uncertainty. The field of knowledge is divided into three departments, viz., inanimate matter, giving us physics; living bodies, involving physiology; facts and relations called consciousness, giving us psychology, ethics, etc. "The gulf" between the two first of these groups, which he dexterously calls *physics* of inorganic bodies and *the physics* of organic bodies, "has in these last days been firmly bridged over." For a description of the bridge he refers to Professor Huxley's lecture at Belfast. This means that among the questions that are considered settled this is one: "that the science of organic bodies is only a *complication* of the science of inorganic bodies." The unsettled question which he undertakes to answer is—whether

it is not possible "to construct some similar bridge between the now united science of physics, which deals with all phenomena whether organic or inorganic," and "the other science, the science of consciousness"?

We must first do justice to the difference between the two sets of facts or phenomena. That there is a difference and it is observed from primeval times is evident from the proverb, "Put yourself in his place," which implies that in men and animals there are certain facts of individual consciousness beyond what we call facts of physical organization.

These facts of consciousness, if the logic means anything, are covered by the term "yourself." Very unfortunately the author observes certain primeval men very early got a notion that this word *self* meant something more, *i.e.* a spiritual, that is a ghostly, substratum of these phenomena of consciousness. This notion came not as the psychologists say, by direct introspection of an entity directly observed, as some like Descartes taught, nor by a subinduced *noumenon*, or a synthetic unity of apprehension, as Kant barbarously explained, but it came in consequence of indigestion—in a dream. Primeval men being given to over-eating would naturally have dreams of their fellow-men—talking and it may be fighting with them. From these experiences they inferred that these dream-images actually left the bodies of their neighbors and came into their own, and they saw and heard them, and it may be fought with them. These spirit-images were very naturally taken to be the spiritual substrata or agents of the conscious phenomena, and were the beginnings of the notion that there are two substances or agents in the universe—namely, material and psychical.[1]

Prof. Clifford proceeds to answer at length in Mr. Huxley's words.

But what has Science to say to all this? First. 'The brain is the organ of sensation, thought, and emotion—*i.e.*, some change

[1] We submit whether the conceptions now substituted for the ghostly Ego, viz., of "a *series* of ideas," "a *stream* of ideas," "a *bundle* of impressions," or "a *thread* of consciousness," or "*a series of feelings which is aware of itself* as past or future," might not be accounted for by the more delicate viands on which philosophic man "has learned to feed, now that he has grown so great," and the more refined images which visit his dreams.

in the condition of the matter of this organ is the invariable antecedent of the state of consciousness to which each of these terms are applied.' This the author asserts is believed by all men of science. We deny that there is any evidence for the proposition in its terms or meaning. It certainly has not been verified by observation or experiment that a definite change in the brain corresponds to every definite experience of consciousness. That some change in its condition may attend each spiritual state may be true, but that one precedes the other [is its cause and its sole cause] or has a counterpart to all its elements is very largely an inference.

Secondly. 'The movements of animals are due to changes in the form of the muscles, and this change of form arises from a motion of the substance of the nerves that go to them. If by motion is meant some molecular change through the length of the nerve, this may be assented to.'

Thirdly. 'The sensations of animals are due to a motion of the substance of the nerves which connect the sensory organs with the brain.' *Due*, that is, solely! From this proposition as thus amended, because it is thus intended, we dissent. It carries with itself most of the conclusions which the author would establish. This plank of the proposed bridge must be rejected, and if it fails the bridge cannot be complete. And yet the author appears not to have dreamed that it would not be assented to, for he states it without any comment or proof. The fourth proposition we omit as not denied. The fifth is in substance that the motion of a part of the brain, or ganglion, excited by a sensory nerve leaves a tendency to be moved in the same way, and the resuscitation of the motion is the physical cause, *i.e.* the sole cause, of every act of memory, including the presentation of the object remembered and the act of remembering, and its reference to time. This memory is twofold, ganglionic and cerebral. What we have said of 1, 2, 3 applies to this.

Besides these direct excitements, resulting in sensation and prompting to bodily action, there are side excitements of fibres associated with one another, resulting not in bodily action but in tendencies to action. This excitement of brain-fibres depends on the flow of blood to one fibre or another. Upon which we have this luminous remark: "And it is a curious property of

the nervous system that *it* can *direct* the supply of blood which is to be sent to any part of it. It is possible by directing your attention to a particular part of the hand to make it sore, and thus the marks called *stigmata* have been produced. Without noticing the edifying part of this side-blow at the superstitious, we ask only, What is the *it* called the *nervous system?* Is it the whole or some part? If the whole, how could the whole of the brain direct a supply of blood to a part; and what is the *attention*, and who directs it to the hand when the *stigmata* follow?

From sensations and brain mechanism he proceeds to the facts of consciousness, which he wishes to reach by his bridge. The first point asserted is that any so-called present state of consciousness is complex, consisting of several elements in different degrees of energy. Of these two or many, if one occurs a second time its associates tend to recur; thus *a link*, whatever that may mean, is established between the two. These links are not only between sensations and sensations only, but also between sensations and exertions. Trains of conscious states may intervene between the one and the other, and exertion is also *voluntary* and *involuntary*, whatever these may be. The author does not tell us, and we certainly cannot explain by means of any data which he gives. He does, however, attempt to tell us what *judgment* is — that act which is supposed to be by eminence intellectual, and to lift men out of the lower regions of sensation. This is his definition: "*Any beginning of an action is what we call a judgment;*" *i.e.*, any experienced or refined sensation which awakens an impulse to action is the nucleus of intelligence. "If you consider what a proposition means, you will see it must correspond to the beginning of some sort of exertion. When you say that A is B, you mean that you are going to act as if A were B." "The assertion that the water is frozen implies a bundle of resolves which means—Given certain other conditions, I shall go and walk upon it." We grant that the impulse to act may sometimes attend the act of judgment, but it does not for this reason define it. It may be true that when some of Prof. Clifford's readers say or judge there is no God they will act as if there were none, but charity bids us to judge, or at least to say, that it is one thing for Prof. Clifford to judge and another to act the lie, *there is no God.* This

doctrine of judgment is not, however, original with our author. Prof. Bain is well known as its author, as also of the kindred notion that belief is resolved into expectation. Both are poor make-shifts to which the cerebral philosophy is driven, under the difficulty which it finds of accounting for any connection of conceptions or ideas higher than brain mechanism provides for.

From action Professor Clifford proceeds to character. Character is concerned only with voluntary action, and in "voluntary actions what takes place is that a certain sensation is communicated to the mind, the sensation *is manipulated by the mind*, etc." "The character of the person is determined by the nature of the manipulation." And pray, Professor Clifford, what place in your theory have you made for the mind or its manipulations? Indeed, what is the mind but the brain-mass, and how can *it* manipulate? Even if we allow that *it*, the nervous system, can direct the flow of blood, how are sensations manipulated so that "conclusions are drawn and thus a message is sent out which causes certain motions to take place"?

He adds by way of caution, as the result of these manipulations, character slowly changes, but only slowly.

After this analysis of the second class of facts, viz., the facts of consciousness, the author traces the parallelism between them and the facts of the nervous system, the facts of the first class. As the physical stimulus of the sensory nerve is followed by the impulse of the motor nerve, so the sensation is followed by the response of the mental fact that moves the hand. So is it universally of all mental facts—they are parallel to some changes in the brain. His logic is this. Because it is true of a *limited class* of physical phenomena that they depend on (partially some would say, Prof. Clifford wholly,) or are definitely traceable to nervous or brain changes, therefore it follows that *all* mental phenomena are dependent as completely in every particular on correspondent brain or nervous changes. We need not stay to indicate where this logic fails.

He proceeds, however, to observe that tho this parallelism is so close and complete, there is an enormous gulf between the two classes of facts. The phenomena of the one class are open to the observation of all. They are called objects or phenomena. Facts of consciousness are known only to one man. Of the physi-

cal facts we know they are complete within themselves. From the stimulus of the light to the eye as its motions proceed to the brain along the track of the sensory nerve, and return by the path of the motor, "these motions are perfectly complete physical trains, and every step is fully accounted for by mechanical conditions." There is no force lost and none created, in nerve or brain or muscle. But how is it with the other effects and the force which produces them? This is the answer: "Therefore it is not a right thing to say, for example, that the mind is a force, because if the mind were a force we should be able to perceive it." "Again, if anybody says that the will influences matter, the statement is not untrue but it is nonsense. The will is not a material thing, it is not a mode of material motion." "The only thing which influences matter is the position of surrounding matter or the motion of surrounding matter." It will not be forgotten by the attentive reader that the writer of these sentences had previously spoken of the nervous system as directing the supply of blood to the parts of the brain, and of the mind as capable of so directing the attention to a part of the hand as to determine the blood to a definite place in the organism, so as to produce *stigmata*. It would seem that the mind or will in such cases might properly be called a physical force. In any event there is a clear distinction which Professor Clifford has more than once admitted between the power of the mind to direct physical force and any supposed power to originate such a force.

As the result of this reasoning he concludes that the body is "a physical machine which goes by itself according to a physical law; that is to say, is automatic." "But it is not merely a machine, because consciousness goes with it." "The mind then is to be regarded as a stream of feelings which runs parallel to and simultaneous with a certain part of the action of the body," etc. "An automaton, however, is not a puppet. A puppet is moved without by strings or wheels. An automaton is moved from within. We act as our characters impel us. But our characters are made largely for us, as we inherit from others. We impart to others also." To the objection that we exclude freedom by this conception, it is replied: But what higher freedom can we have or desire than to act of ourselves as our characters

impel? Rather should we reason: If we are not automatic, we are not responsible. We ought to judge that the doctrine that Providence or destiny adds other forces than these of brain and inherited character is the essence of immorality.

Having proceeded thus far, the author reviews his course to discover how far he has succeeded in establishing a bridge between the two classes of facts, viz., the organic and the psychical. He concludes that inasmuch as brain and nervous organism so far back as we know them, are probably attended by corresponding parallels of consciousness, if we accept the doctrine of evolution we must believe that in the very lowest organism, even in the *amœba*, there is something inconceivable to us which is of the same nature with our own consciousness. We are forced to another step even. We cannot stop at organic matter. Following the law of continuity, and holding that the organic by physical processes were formed from the inorganic, we must believe that to every motion of matter which corresponds with mental facts in ourselves, that is to every motion of every molecule, there is a correspondent sensation or something like it. As there is presumed or known to be a parallelism between a complex brain and a complex of consciousness, and as the organic brain is physically developed from unorganized matter without breach of continuity, so mind must stretch in its parallelism, as far back as there is physical motion in a molecule.

One leap more and the author attains his loftiest flight. The so-called physical objects, including the organic, are as known by and to us only feelings, over against which we postulate a correspondent reality. But if the reality can correspond to a mental feeling, this must be made of the same stuff with it. "What I perceive as your brain is really in itself your consciousness, is you; but then what I call your brain, the material fact, is merely my perception." The two elements are not indeed the same, but they must be made of the same stuff.

Therefore this solid universe, with its phenomena present to sense and its phenomena present to consciousness, may at any instant be resolved into particles which by motion become the stuff that mind, that is that dreams, are made of.

Excepting this last speculation and one or two other points

as the opinion expressed in respect to the transformation of energy in the brain, Professor Clifford declares that the doctrine he had expounded "is the doctrine of science at the present day."

But Professor Clifford does not rest here. In view of these conclusions as the last word of science, he asks, Have we any authority for believing that consciousness can exist without a nervous system? We answer, All the consciousness that we know of is thus associated. This fact of itself creates a probability and should make us cautious in concluding in any direction opposite to uniform fact. But if the one general conclusion is established that motion and consciousness everywhere attend one another, then to believe that consciousness could occur without its pendant manifested to the senses would oblige us to deny that matter is what our belief in the uniformity of nature forces us to believe it to be, viz., always manifest to the senses, and that mind always is connected with such a manifested basis. We conclude, then, consciousness without a material counterpart is an absurdity.

The next question is whether the physical universe or that portion nearest to us may not be one vast brain, whose movements are paralleled by a consciousness as complex in its elements and as vast in its grasp? This is just possible, he says; but such a brain cannot be analogous to any we are familiar with, because in these there are disturbances which are parallel to the conscious acts, and in the *inter-planetary spaces there is no evidence of such material substratum.* But is it not just possible that the stars are atoms in some vast organism which might be adequate to such conscious acts? To this he gravely replies, It is just possible. But were there such an organism, it could not be affected through vision of events in the solar system, and according to any laws of matter known to us "it could affect the solar system only by its weight."

The question is in substance this: What is the last word of science respecting the being and agency of one Eternal Mind? To this question he replies:

"On the whole, therefore, we seem entitled to conclude that during such time as we can have evidence of, no intelligence or volition has been

concerned in events happening within the range of the solar system, except that of animals living on the planets. The weight of such probabilities is of course estimated differently by different people, and the questions are only beginning to receive the right sort of attention. But it does seem to me that we may expect in time to have negative evidence on this point of the same kind and of the same cogency as that which forbids us to assume the existence between the earth and Venus of a planet as large as either of them."

In this delicate and periphrastic phraseology does our *enfant terrible* utter the conclusion which he is compelled to derive from the facts and principles in which all who have a right to call themselves men of science are agreed, viz., there is no God; because there is no evidence of a brain large enough to perform the functions of the Eternal Spirit. We must own that we are surprised at the subdued tone of the announcement. We had been prepared for a more emphatic burst, befitting the tremendous conclusion. We conclude that our author, like Bottom in the "Midsummer-Night's Dream," while he had at first resolved "I will roar that it will do any man's heart good to hear me," on second thought resolved "not to frighten the ladies," and concluded, "I will roar you as gently as any sucking dove; I will roar you an 'twere any nightingale."

But let us pause a moment on the hight of this great argument, up which we have been conducted by many laborious steps, and survey for a moment the steps which have been laid for us. Has our guide succeeded in his attempts first to bind all phenomena, the inorganic, organic, and conscious, by one continuous bond, thereby excluding from the universe spirit as man and spirit as God? As we followed the steps we questioned not a few of them. The first step assumed the whole argument, and not a few were such as the logic of true science would hesitate to affirm. Consequently our breath has not been quite taken away by the appalling conclusion in which there is nothing appalling but its effrontery, and nothing redeeming except the studied moderation of its diction.

He does not leave us to our reflections. He anticipates that the conclusion will leave a blank to many hearts, "because they take away the objects of very important and wide-spread emotions of hope and reverence and love," and "that they de-

stroy the motives for good conduct." To this he replies that healthy emotions are felt about facts and not about phantoms, and the question should never be what is pleasing or displeasing to our feelings, but what is true? To reason for or against evidence from the relation of belief to action is most demoralizing. Then these little guesses of ours are very untrustworthy any way, when perhaps "there is not one man in a million who has any right to a definite opinion about them." Such men are of course certain eminent psychologists like Professor Alexander Bain or certain comprehensive philosophers like Mr. Herbert Spencer.

But there is one truth that all men believe in, and that concerns the distinction between right and wrong. "Duty to one's countrymen and fellow-citizens" "is in all healthy communities the one thing sacred and supreme." Whether or not in addition to this instinct we have the voice of an unseen person also, the voice of the instinct itself "loses nothing of its sacredness, nothing of its clearness, nothing of its obligation." This reassures us somewhat. We confess that we have our fears lest the theories of science of the soul which we have explored will fail to redeem all these fair words about duty.

We proceed then to inquire, What, then, is Duty and Right and Conscience and Virtue as explained by their expounder? We find his answer in the essay on the "Scientific Basis of Morals" and the lecture on "Right and Wrong: the Scientific Ground of their Distinction," both produced in 1875.

Declining the attempt to analyze Clifford's arguments in order, we give the most important definitions and conclusions. In the first of these essays we find the following: The moral judgments and feelings are the product of the social instinct as modified by the law of evolution. They grow out of the *tribal self*, in which every human being is more or less distinctly a sharer. To understand the import of this term we need to consider the several senses and applications of the term *self*. This is properly and primarily applied to "the stream of feelings which make up a consciousness regarded as bound together by association and memory." Next it is applied to a select portion of these feelings, not including the corporeal, altho strictly "my foot is certainly a part of myself, because I get hurt when any-

body treads on it." When we desire something in the future we personify or abstract its future consequences in our feelings and think of it as suitable or unsuitable to ourselves—either tribal or individual. With the simpler races the conception of self is less developed and more indefinite and wide. It is universally expanded so as to include one's tribe, which is thus an expanded self, or stream or bundle of feelings. "The savage is not only hurt when anybody treads on his foot but when anybody treads on his tribe." All his future hopes and fears reflect the enjoyments and sufferings that make up his future tribal experience. "We may doubt whether the selfhood of the tribe is not earlier in development than that of the individual." "In the highest natures it finally takes the form of humanity." Under the law of natural selection *piety* toward the tribal self grows necessarily strong, those groups of men in which it is weak being extinguished by the struggle for existence. The fittest to survive are those whose intenser piety toward this tribal self is the strongest. The tribe soon finds out that to exist it must love piety towards itself. It likes the deed that conduces to its welfare. It likes the character, the man from whom the deed proceeds. Similarly it dislikes the deed and the man who is *impious* towards itself. By and by the man learns to judge of his deeds and himself by occupying the place of his tribal Self, and this is Self-approbation and Remorse. Next comes *Right*. "Right actions are not those which are publicly approved, but those whose public approbation a *well-instructed* tribal self would like." Moreover, there are two ways of expressing disapprobation. "To chase a man away as a noxious beast, and to punish him for doing wrong, these are two very different things." In the second case we desire to improve the character of the offender or the character of those who witness his punishment.

Responsibility belongs to a man who "can be punished for doing wrong with the approval of the tribal self."

The *categorical imperative*, or the obligatoriness of duty, results from the circumstance that the ethical maxims are matured by natural selection, so that they are not disputed. "Hence it is that the moral sense of the individual, tho founded on the experience of the tribe, is purely intuitive; conscience gives no

reasons." But tho in their form the commands of conscience are unconditional, in their application to the individual they are subject to many conditions. They declare: If you do not obey, the tribe will say, in the name of the people, I hate you, and the voice of the tribal self will say to the man, I hate myself.

In its derival of moral judgments from the imagined judgments of society this theory is identical with that of Adam Smith. It differs from it in one or two very important particulars. The theory of Smith assumes a conscious distinction between the individual self and his fellows. It connects the two by a natural sympathy with the feelings of judgments of our fellows, under the operation of which each man imagines his fellowmen to approve or disapprove himself, and sympathizes with their favorable or unfavorable judgment and feelings, and thus by "putting himself in their place" builds up a conscience for himself.

The theory of Clifford finds its origin in the failure to distinguish the two, or the necessary blending or absorption of the individual self in the tribe—a blending so complete that "the savage is not only hurt when anybody treads on his foot but when anybody treads on his tribe."

In Smith's theory the conscience or second self is built up in the conscious life by the processes of association in the individual soul enforced by individual sympathy. In the theory of Clifford and Darwin the undiscriminating identification of the tribal with the real self grows into a commanding law under the operation of natural selection, inasmuch as every tribe in which it is not strong is wiped out of being in the struggle for existence and tribal feeling becomes supreme by heredity. The theory of Smith does not exclude voluntariness and individual responsibilities. The theory of Clifford resolves the self into a stream or bundle of sensations which for a long time are somehow expanded so as to include our fellows. It makes no provision, however, for voluntary action or responsibility.

The important subject of voluntariness or freedom as related to moral responsibility is indeed discussed at wearisome length in the second of the essays referred to, in which the author usually logically adheres to the position that in brain movements and

their parallel in conscious phenomena we do just as our invented brain and parallel impulses would make us do, and that any other explanation of responsible action is irrational and immoral. One singular exception occurs which is more glaring than the similar oversight which we have already noticed. Suppose, he says, that by memory several motives are set in action. "Then *I* choose which of these motives shall prevail. Those who carefully watch themselves find out that a particular motive is made to prevail by the fixing of the attention upon that class of remembered things which call up the motive. The physical side of this is the sending of blood to a certain set of nerves—namely, those whose action corresponds to the memories which are to be attended to." Again: "We distinguish this mass of passions and pleasures, desire and knowledge and pain, which makes up most of my character at the moment from *that inner and deeper motive-choosing self which is called Reason, and the Will and the Ego*, which is only responsible when motives are voluntarily chosen by directing attention to them." These extracts need no comment; they are manifestly oversights. The author had obviously forgotten his system and its logic when he wrote them.

Otherwise he is consistent throughout. Moral law is a natural growth, the product of circumstances. Under the law of development virtue is not good because it makes the tribe strong, but virtue is good because the strong tribes kill off the weaker. The excellence and obligation of goodness are not derived from any permanent fitness or adaptation to the well-being of society, but from the fact that society, under the laws of descent and struggle, has propagated the social instinct into unquestioned supremacy.

From these principles our outspoken and generally logical reasoner derives the following inferences, which he does not hesitate to avow: First, "right is an affair of the community and must not be referred to anything else." "The first principle of natural ethics is the sole and supreme allegiance of conscience to the community." "An immediate deduction from our principle is that there are no self-regarding virtues properly so-called, those qualities which tend to the advantage and preservation of the individual being only morally right in so far as they make him a more useful citizen." "The virtue of purity,

for example, attains in this way a fairly exact definition." "My happiness is of no use to the community except in so far as it makes me a more efficient citizen." Veracity is obligatory for a similar reason. Whenever deviations from it are excused the community is in fault. Veracity to the community depends on faith in man; that is, in the individual man. We Englishmen, however (perhaps because we are strong in the tribal instinct), abhor the man who tells a lie or who suggests that a lie may sometimes be excused for its usefulness!

Such is a brief *résumé* of the ethics of our rampant philosopher. It will be remembered that when he had demonstrated that science knows there is no God, he had cheered and comforted us by the faith that Right remains and is eternal. This led us to search after his conception of the nature of Right and the grounds of our confidence in its supreme and venerable authority. We have followed him step by step, in every separate and subtle track of his analysis, and with what result? "Might makes right. All duties are merged and resolved into the growing predominance of the tribal self. Man emerges from the brutal condition by becoming more social. As he loses himself more completely in the tribe, the tribe takes more and more complete possession of his being and gives greater energy to his social nature. At last the organized community writes its behests in his very brain and they are henceforth enforced by an unquestioned authority."

The most superficial reader of ethical systems will not fail to recognize the close affinity of this theory with the tendency of the ancient schools to exalt the state as supreme. The ancients, however, never wholly overlooked the rights and duties of the individual man in their theories, however completely they disregarded them when they came into conflict with the interests of the community. Even the modern theories which are most nearly allied to the one before us have verily ventured to conceive of moral relations as an outgrowth of unconscious impulses into that unquestioned predominance which gives to conscience its sacred authority, and to faith in the ultimate triumph of the Right its capacity to dare and to die.

Professor Clifford begins by materializing the spirit and denying its immortality. He next degrades the intellect and debases its methods so far as to belittle science and eliminate the

Creator. With reassuring words he cheers us with the declaration that Right and Duty and Virtue will ever remain. But Right and Duty and Virtue in their turn are resolved into the chance products of those blind and balanced forces that have built organized society to its present momentary structure. To the individual man is denied the not ignoble privilege and dignity of offering himself a *willing* sacrifice upon the altar of the public welfare. But even this self-sacrificing impulse is not the choice of his loving soul, but the product of a thousand lucky accidents which the mighty ocean of being has tossed into momentary existence—a glittering bubble from the crest of one of its yeasty waves.

Nothing is more noticeable to the reader of these essays than the contemptuous but half-suppressed scorn with which their author rejects the scientific possibility of a personal God, and the passionate fervor with which he enforces the charms and authority of Duty and Truth. A profounder analysis and a more teachable temper would have taught him that a satisfactory science of Nature and of Duty require as their fundamental axiom the existence of an Intelligent Creator, and that a materialistic evolution which rejects God can explain neither Science nor Man nor Duty.

A single reflection occurs to us in connection with Professor Clifford's "Theory of Ethics." If all duty is resolved into our allegiance to the community, and if scientific men are alone competent to understand those truths and facts which may guide the judgment of the community, and if upon some of the most fundamental truths only one in a million is so qualified, then it follows that duty to the community may require that a priesthood of science should assume to itself the functions of regulating the interests and actions of communities and individuals. The process of natural selection as we ordinarily conceive it would be greatly accelerated if the ignorant and obstinate, particularly those of the fanatical and religious sort, should be weeded out by summary methods. Under the law of the survival of the fittest, the obstinate and the unenlightened might disappear, and a hardy and healthy stock of cool-brained and clear-thinking citizens might bring into exclusive possession and intense energy the impulses that tend to human welfare.

We observe that no subject moves Professor Clifford to such uncontrollable excitement as the influence of a religious priesthood. In view of its past history, and in the immediate prospect of some terrible revival of its power, he at times almost loses his self-possession and his dignity. We can almost excuse him for the violence of his emotions at the thought of the enormities of abuse which a religious and even a Christian priesthood has often occasioned in the past. We see no occasion, however, for any dread of the immediate recurrence of its debasing and cruel domination. Our apprehensions, we confess, take another direction. In our judgment no priesthood of religion could possibly be so remorseless and so irresponsible as a priesthood of modern atheistic science, should it accept the ethical and sociological doctrines of the evolutionary ethics. The Christian priesthood, with all its craft and unscrupulousness, with all its fanaticism and want of sentimentalism, could never wholly forget the gentle and humane precepts of the gospels and the example of its self-sacrificing High-priest. But a select scientific high-priesthood which should adopt the theological ethics of Professor Clifford would have nothing within itself to control its confidence in its own infallibility or to limit the means or the inclination to execute its remorseless decrees.

The city of Paris has more than once been the witness of what each of these priesthoods could be and do. The massacre of St. Bartholomew's is often referred to as an example of what priestly fanaticism in religion could inspire. But terrible as was this scene, it does not compare with those other spectacles of cruelty and horror in the same city which the priesthoods of atheistic, ethical, and political science have sanctioned if they have not inspired. As between the two we greatly prefer the domination of the Christian to the scientific hierarchy.

We should fail to do justice to Professor Clifford did we not distinctly refer to the paradoxical daring and passionate earnestness with which he has expressed his views on every point to which we have referred. His essay on the "Ethics of Religion" includes page after page of scathing denunciation of the baleful influences which religious priesthoods have exercised upon every interest which can ennoble or bless the human race. At the close of the essay he relapses for a moment into a calmer mood.

He bethinks himself of such "a comradeship with the Great Companion" as once fired his own youthful ardors and still elevates and inspires the faith of Maurice and Kingsley and Martineau. But this relapse is but for a moment. Shaking off the spell, he concludes with this Titanic utterance: "For after such a helper of men, outside of humanity, the truth will not allow us to seek. The dim and shadowy outlines of the superhuman deity fade slowly away from before us, and as the mist of his presence floats aside we perceive with greater and greater clearness the shape of a yet grander and nobler figure—of Him who made all gods and shall unmake them. From the dawn of history and from the inmost depth of every soul the face of our father-man looks out upon us with the fire of eternal youth in his eyes and says, 'Before Jehovah was, I am!'"

The essay on "Cosmic Emotion" gives us his theory of religious and ethical feeling, partly in the way of philosophic analysis and partly in the tone of an Orphic hymn. The Cosmos is contemplated in its double form, as the macrocosm of nature and the microcosm of souls. The first by its mass and complexness, coupled with the experience of disappointment in the attempt to grasp it as a whole, calls forth our veneration, resignation, and submission; the other presents the highest possible generalization of what we call good in character, and awakens the emotion of the second kind such as is expressed by Wordsworth's ode to Duty. These two grand and closely related objects, when contemplated by the common eye, move us strongly; but when viewed by the armed eye of science, which connects them together in those intimate relations which unite matter and spirit, and, more than all, reads the history and destiny of each in the light of evolution, they kindle and sustain the most fervent worship, obedience, and hope. The Cosmos has ever been growing and is ever to grow to our knowledge, and which our wonder and worship can never overtake and master. Human nature has grown out of it, as what we call matter has been slowly evolved into life and life has been transfigured into spirit. Spirit became capable of morality when the tribal self began to control the individual, and band-work began to be recognized as the supreme good. Moral goodness has been achieved as the social has new-molded the individual. The

morally better is another name for the necessarily more evolved. The morally evil are but the crude and rude impulses that have not yet been outgrown, the wildness of savage blood that has not yet been fully refined. Moral character is indeed everything; the deed and wish is nothing in the comparison. But character is as truly formed by the laws of environment as are the forces of nature. "The social organism itself is but a part of the universal Cosmos, and like all else is subject to the uniformity of nature. The production and distribution of wealth, the growth and effect of administrative machinery, the education of the race—these are cases of general laws which constitute the science of sociology. The discovery of exact laws has only one purpose—the guidance of conduct by means of them. . . . And the use which the republic must make of the laws of sociology is to rationally organize society for the training of the best citizens. Much patient practice of comradeship is necessary before society will be qualified to organize itself in accordance with reason. But those who can read the signs of the times read in them that the kingdom of Man is at hand."

With these bold and significant utterances we conclude our laborious and protracted *résumé* of the creed of this extraordinary man. Many of our readers will agree with us that he is in more than one sense of the term an *enfant terrible* in the scientific household. Not a few will be inclined to raise the question a second time which we have already suggested, whether he represents any one but himself. Some will say that these extravagances of logic and of assertion are simply the legitimate manifestations of a singularly headlong and impetuous nature, endowed with extraordinary gifts of concentration and exposition, whose youthful ardor had manifested itself in feats of gymnastic daring as foolhardy as are these specimens of high-flying reasoning and untamed declamation.

We cannot question that he was just the man he is described to have been. A single look at his portrait interprets him as endowed with a fearless, self-confident and singularly good-humored tho defiant nature. The history of his changes of opinion, the successive struggles of thought and feeling through which he fought his way from his High Churchman-

ship into the rampant atheism in which he died, are not given us by his over-dainty biographer. Such a history of his progressive change of opinions and their attendant emotions as we have in the diaries and letters of Blanco White or Theodore Parker, or Arthur Clough or John Sterling, would be most instructive in many most important particulars. All the light that we have upon these points is found in the two lines from his biographer which speak of "an intellectual and moral struggle," and the pathetic confession in which he says, "We have seen the spring sun shine out of an empty heaven to light up a soulless earth; we have felt with utter loneliness that the Great Companion is dead."

Our chief concern is not, however, with the man, much as he alternately fascinates and repels us, but with the question how far he represents the principles and methods of the various classes of evolutionists of the present day. In answer to this question we observe, first, that Professor Clifford is not an Agnostic. In this he apparently differs from Spencer and Tyndall and all those who contend that, while science admits that there is an Absolute, she affirms that he can never be so known by man as to be formulated in thought or phrased in words; that consequently a positive revelation, a scientific or philosophical faith, a rational worship are impossible. As against these men, Clifford asserts that at present science finds not the slightest reason to believe there is any entity not finite, and that in all probability she will soon be able to demonstrate that no such being exists.

In this position Clifford is by no means alone among the negative thinkers. We have the best authority for asserting that many of the adherents of Mr. Spencer reject altogether all his concessions which gave form and being to agnosticism as wholly untenable and inconsistent, and regard his very elaborate attempts to mediate between science and religion as irrational excrescences in the philosophy of evolution.

In respect to the nature of the soul, its possible survival of the body, and the nature and authority of conscience, Professor Clifford holds the doctrines common to this school. He differs from his associates only in the more pointed and effective way in which he states the common creed, and the more

offensive phraseology in which he characterizes the opposite opinions, and the more fearless deduction of the logical conclusions to which it leads. However uncomfortable and troublesome this *enfant terrible* may be in the household which he represents, he may render a very important service to those who are hesitating whether to attach themselves to that section which represents the agnostic and vacillating atheism of Spencer or the gnostic and positive atheism of Professor Clifford.

There is another eminently respectable and conservative section of scientists who hold the conclusions of Professor Clifford in positive and outspoken abhorrence, and who are theists in their personal and scientific faith. They are evolutionists, but are neither materialistic nor atheistic evolutionists. They believe in the soul and in conscience, in a future life and a personal God, and many of them in a supernatural revelation. They find nothing in the teachings of science or the doctrine of evolution, as they hold it, which is inconsistent with their Christian faith or their theistic philosophy. Some few of them may be equally distinguished in science and theology.

Nothing could possibly be more unjust or odious than to intimate that the evolutionists of this school either sympathize or symbolize with the conclusions of Professor Clifford. It is, however, a fair question which we ask, and which every seeker after truth would do well to repeat, Whether and how far the logic of the two schools is common, and whether the Professor is not sometimes the more consistent because the more fearless logician of the two? This question is no question between science and theology, but one that is more profound and important—viz., What is scientifically true, and what methods of investigation may be trusted in interpreting the indications of nature so far as they unroll the mysterious history of the past or warrant our confidence in the magnificent promises of the future?

The first question that we ask ourselves when we open any work on these much-vexed questions should not be what the author believes or attempts to prove, but *how does he reason?*—not what are his conclusions, but *what is his logic?* what are his views of the mind that interprets nature; what his views of the methods of studying nature; how far does he strain, and when

does he limit the analogies that bind nature and spirit into one system; and how quick is he to detect the differences which indicate the presence of nobler forces and higher laws? If in any application whatever he accepts the shallow logic and the hasty analogies of materialism, if he practically accepts the canons of induction which degrade knowledge to mere facilities of association, or the play and counter-play of brain mechanism, we care very little what his scientific creed may be, or, for that matter, what are his theological avowals. His heart may be better than his head, while he is responsible in the field of science only for the latter. His principal conclusions may be scientifically and theologically orthodox, while his methods of inquiry and many of his special opinions are thoroughly untenable and permanently mischievous.

We may be permitted to repeat with all frankness that we have not designed to make a scarecrow of the extreme opinions of Professor Clifford, or to fasten them upon any who disavow them, but simply to call attention to the logic of his conclusions. We therefore respectfully ask the attention of all our scientific friends to the inquiry, how far their logic is similar to his: not so much in the final summing up of the subordinate arguments to their grand conclusions, but in more or fewer of the short and apparently easy steps which he takes from the inorganic to the living, from life to spirit, from spirit to conscience, and the skilful slight-of-hand by which he substitutes an accessory for a principal relation, and confuses and mystifies himself and his readers by glittering but treacherous analogies. We would beg them to consider whether, even by accepting evolution as a "working hypothesis," even in the origination of species, with the frank concession that not a single instance can be adduced of any well-known and thoroughly accredited species which has been produced by the actual "working" of evolution, they do not commit themselves to the merciless grasp of a logic from which it may not be easy to escape.

NOAH PORTER.

THE ORGANIZATION OF LABOR.

I. THE ORGANIZER AS A PRODUCER.

ONE of the features of our social system most worthy the attention of the thinker and suggestive of the future of society is the constantly increasing part played by organized bodies in the work of producing wealth. Since the time of Adam Smith political economy has considered society as made up of a collection of individuals each seeking his own welfare and comparatively unmindful of the welfare of others. Its fundamental principle has been the doctrine of individual liberty, which makes each man the sole disposer of his own productive powers. Its maxim is found in the "let-alone principle," which declares the interests of society at large to be best subserved when this liberty is most fully recognized by the state. By enunciating this fundamental principle, and by tracing it to its natural effects upon the welfare of individuals and of society, political economy was first raised to the dignity of a science. The spirit of individual independence allied itself to the intellect of the age, and both together, forcing governments to adopt their principles, have resulted in a general development of the powers of mankind which would have been unattainable under any older system.

The fundamental principles of the great economists from Smith to Mill must remain at the foundation of sociology so long as human nature shall continue what it now is. The form of presentation may vary, but the system of the economists must be the one first taught to the learner in order to serve as a foundation for such further ideas of sociology as may be necessary to his mental progress. We must not therefore be looked

upon as desiring to take a single stone from the structure when we say that it does not afford a sufficient basis for an understanding of the more complex system which is now so rapidly growing.

The first real step towards making an important and lasting addition to the current political economy should, we conceive, be credited to Herbert Spencer. Apart from all questions of the philosophic soundness of his conclusions, one thing must, we think, be conceded by all unprejudiced critics; namely, that whether his law of evolution is or is not a law of nature, it does, as an empirical generalization, include an extraordinary range of general facts. No one who studies the facts of progress, whether in the development of the chicken from the egg or in the improvement in the conduct of men from the savage to the enlightened state, can fail to be struck with the change from homogeneity to heterogeneity, from indefiniteness to definiteness, and with the co-ordinated processes of differentiation and integration. Adam Smith and his successors considered society as a homogeneous collection of individuals, each in the enjoyment of equal rights and liberties, and each capable within his own sphere of judging what was most for his own advantage. Of course the actual existence of co-operative organizations was not denied, as is shown by the prominence given to the discussion of the division of labor. But the tendency to aggregation of individuals into discrete bodies, each having in itself the properties of an organism, formed no integral part of the system, being used simply as an illustration of the advantage of co-operation and the consequent tendency of individuals to engage in co-operative employments through the impulse of self-interest. This tendency to the formation of discrete organisms, which was simply a corollary of human liberty in the time of Adam Smith and his system, must now form the basis of any system of sociology which shall enable us to understand the complications of modern society, and to legislate for the amelioration of the laboring classes.

The tendency of which we speak is not only no new thing, but, in many of its aspects, it looks like an approach towards a state of things which we are accustomed to regard as belonging entirely to a less enlightened age. It has been the universal

rule that a high degree of efficiency in the combined action of large masses of individuals can be attained only by their submission to some kind of leadership. A community entirely without organization, each individual acting for himself, is at so great a disadvantage in coping either with the forces of nature or with a common enemy of any kind, that its continued existence would hardly be possible. In fact, such a community is unknown, and is approximated to only in the lowest stages of society. As society advances we find great changes both in the fundamental ideas on which organizations rest and in the objects for which they are intended. We must expect that, as a rule, each society will tend to the form best adapted to its preservation and efficiency under all existing conditions both internal and external. Now, in an advanced state of society these ends can be attained only by the formation of organisms having perfect co-ordination among the functions of their members, and there are certain conditions under which this co-ordination cannot be secured except by a system of subordination not in unison with the ideas of equal rights now prevalent. There is, in fact, a singular parallel between our present labor organizations and the feudal system in the feature of subordination on the one side and leadership on the other, and especially in the disparity between the number of the leaders and of the led. In point of efficiency this system was far in advance of those which it superseded, and, viewed in the light of the optimistic philosophy, may appear as the one best adapted to attack and defence when the masses were of a nearly uniform degree of degradation and ignorance, and moral energy was the attribute of the few. Such enterprises as the Crusades would have been impracticable under any system which did not permit of the subordination of the many to the few. When the power of organization and command is confined to the few, each of these few must, of necessity, have large masses of followers if they are to make the best use of their power. We may therefore consider feudalism, or some kindred form of organization, as the natural result of a state of things in which the great masses of men are cast in the lowest mold and only a very limited number in the highest one.

When the pursuit of wealth and comfort through the regular forms of industry took the place of war as the principal ob-

ject of human activity, a new plan of social co-operation became necessary. One man might lead his thousands or ten thousands to war, but, as things then were, he could not lead a score in the work of making clothes or tilling the soil. Instead of depending upon the endowment of the leader, efficiency began to rest upon the skill of the individual. The increased means of subsistence with which increased wealth supplied the individual led to an amelioration of the physical condition of the masses, widened the sphere of each man's thought and activity, and so became productive of a corresponding intellectual improvement. At length those ideas of individual freedom which had from time immemorial been the heritage of the English race were placed on a scientific foundation by the political economists. At the foundation of the structure thus reared was the principle that the individual was born the rightful arbiter of his own destiny, owing service to none and claiming from others only what they had contracted to give him. Under the operation of this principle no organization can exist except such as is formed by a voluntary aggregation of individuals, each seeking his own personal welfare. Society was in a certain sense relegated to a state of nature, in that each individual was, like the lower animals, to be freed from the control of his fellows so long as he respected their equal right to the same freedom he himself enjoyed. The let-alone principle, *laissez aller*, *laissez faire*, was put into practical operation by the English race; the strong were allowed to prosper and the weak to be crushed out by the remorseless processes of competition in trade and industry.

The feature of this economical process with which we are at present principally concerned is the small account which it took of the natural diversity among the talents and capacities of men. This diversity, tho not entirely ignored, was rapidly passed over as not forming the basis of any important generalization. The doctrine of the natural equality of the powers of all men, tho not definitely formulated, was tacitly assumed as sufficiently near the truth for the purposes of argument. A scientific foundation was sought for the theory of value by expressing all value in terms of labor, and measuring all labor by the primitive powers of the untrained or uneducated man. The essential difference between skilled and unskilled labor was supposed to

be this: that skilled labor embraces two elements, the one the primitive faculties of the natural man which he possesses equally and in common with all his fellows; the other, acquired skill, which was supposed to be the product of labor spent in its acquisition, and which thus represents a kind of capital. In the first element all men might be considered so near alike that diversity could be ignored. In the second element they bear the same relation to each other as if the possessor of skill had been the capitalist inheriting wealth or saving it from his earnings, and the unskilled man one who had spent as he went and therefore saved nothing. In a word, if A could earn a much larger income than B in the same employment, that excess of income was assumed to be measurable in terms of money and labor previously spent by A in acquiring his skill, and to represent the interest on this investment. All pursuits were assumed to be equally open to all men, and, as as a logical result, the law of competition holds between different pursuits as well as between different individuals in the same pursuit. If one profession was permanently more profitable than another, after making allowance for the time and labor spent in its acquisition, then an excess of candidates would be attracted to it, until its profits were reduced by competition to the general level. The logical conclusion was that all complaints about the inequality of conditions among men were baseless, because one man was in better circumstances than another only because he or his parents had been more frugal and industrious.

Since the time of Adam Smith a revolution has taken place, which, altho it does not supersede his theories, requires them to be extended, modified, and supplemented. The tendencies towards Smith's laws of labor and value of course exist, but they are completely overpowered by causes of an entirely different character. The very freedom secured to each man under our political system, and his security in the possession of his earnings, lead to the combination of great masses of men working in unison for a common object. It was found that the combined product of the labor of all was far in excess of what it was when every one worked independently, and thus a system has arisen under which *a constantly increasing proportion of wealth is produced by large bodies of men working in co-operation.* The result

is seen in the great industrial organizations which now play so important a part in the production of the world's wealth.

Such organizations would, in the natural progress of events, have gradually increased in importance with improved processes of industry and the growth of populous centres. But their possibilities have been vastly increased by the introduction of railways and other improved means of transportation. With the former means of transportation all bulky commodities were produced at a great disadvantage, unless in the immediate neighborhood of the place of consumption, or at places accessible by navigation. But with the extension of railways over every part of the country, each industrial organization has the whole land, we might almost say the whole world, before it, as a possible market for its products. It has thus become possible to mass together much larger industrial organizations than were possible when each could supply only a limited market. But this is not the only feature of the case. Effective competition, instead of being confined to producers or organizations near each other, can now spring up between the most widely separated places. The world can be invited to supply all the lighter articles of ordinary consumption to the most isolated farmer on a Western prairie. Of course the introduction of labor-saving devices and of improved industrial methods are essential factors in the new system, and are quite independent of the introduction of railways; but without the latter it would have been impossible for them to have assumed their present social importance.

With every increase in the number of persons co-operating, and in the delicacy of the material and instruments employed, comes an increased necessity for a precise co-ordination among the efforts of all. Thus there grows up an organization which in its outward form is more like a well-disciplined army than like a collection of individual producers of past centuries. A subdivision into commands must be established, and several commands must be combined under a single directing head. Success depends as much upon the ability of these heads as the success of an army does upon the ability of its commander. The isolated man, acknowledging no master, is in many pursuits at as great a disadvantage as an independent cross-bowman would have been among the Crusaders. The number of pursuits

in which he is not at such a disadvantage diminishes with every improvement in production and every increase of population.

In pointing out this resemblance between the system under which our modern industry is being organized and that of a past and darker age, it might seem that we were taking a gloomy view of the future of society and supplying a broad foundation for the arguments of those who claim that our present system tends to the debasement of the masses. But the true lesson to be drawn from the parallel is rather the opposite of this. If, indeed, the subordination of the many to the few which we have described were a contrivance of human genius, there might be some ground for this unfavorable view. But our system has been a perfectly natural growth under the operation of a body of jurisprudence which takes no account of the diversities of power among men, but regards them all as equal before its tribunals. The industrial manager who directs the labor of a thousand subordinates owes his position to no accident of birth, holds a patent from no authority, took his position by virtue of no compulsory law, and has never proved his ability before any formal tribunal. The medieval knight rising from the grave to extend him the right hand of fellowship would be quite confounded to find him wielding his power and holding his position without having fulfilled any of the conditions which the knight had considered necessary, and without possessing the smallest legal authority over the lives of his subordinates. If, then, under a legal theory of complete equality, inequalities so great spontaneously manifest themselves and define themselves more sharply with every generation, what does this prove? That a theory of equal rights and liberties leads to inequalities? No, but simply that inequality is a fact which cannot be set aside by being ignored. The case is that of a law of nature asserting itself without respect to any human theory.

Having taken this general view of the relations between different systems of organizing activities, the next step in our inquiry will be to discuss the changes thus necessitated in the economical theory of value and the practical conclusions to be drawn respecting the method of dealing with the labor problem of the day. When there was only one best way to make every part of a gun, and when that way had been known and followed

for several generations and had thus become public property, there was a good foundation for the theory of Adam Smith that "labor is the original measure of the exchangeable value of all commodities: labor was the first price, the original purchase-money that was paid for all things." When he told the advocates of the mercantile theory that it was not by gold or silver but by labor that all the wealth of the world was originally purchased, and that its value to those who want to exchange it for some new production is precisely equal to the quantity of labor which it can enable them to purchase or command, he taught a valuable lesson, and one which was quite near the truth in his time. And in a certain sense the same thing is true now, but only in the sense that a large part of our wealth may be said to be the product of the steam-engine. Human labor and the power of the engine are alike called into requisition, but neither of them measures the exchangeable value produced.

When Adam Smith wrote, every one who chose to put capital or labor into the manufacture of fire-arms stood on nearly an equal footing, being, with ordinary prudence, secure against failure, and not likely to win a fortune before old age. Every skilled trade had its system of apprenticeship, which was the only passage-way to its mysteries, and which was at the same time open to all who chose to comply with its requirements. When the apprentice grew into the journeyman it was easy to put a money value on his skill, because the latter could be measured by the number of years he had been engaged in learning his trade. Now, however, the art of producing the best kinds of fire-arms and selling them at such prices as shall yield a satisfactory living to the producer is one which is possessed only by a few. No one can say exactly what is the best kind of an arm, so that among scores of competing kinds the selection of the best is a matter of individual judgment, in which there is room for any amount of loss through failure to make the best selection, and any amount of gain through success in hitting upon the right one. Thus the skill of the manager—the "captain of industry," as Professor Walker has called him—has taken the place of labor as the prime factor in the result. As an appreciation of the position and functions of the manager is of the first importance in understanding our industrial system, we must see how he attains his position and what are his functions.

So long as a workshop, factory, or organization drew all its supplies from definite fields in which there was little occasion for change, conducted its operations upon a system which any man of good capacity could master, and sold most of its products within its immediate neighborhood, the problem of its management was one which could be learned as an apprentice learns his trade. When the mode of doing business remained the same through long periods of time, it became possible for a mind not of the highest order to master all the details of management and to conduct the establishment in such a way as to insure success. But the great widening of the field of competition by improved means of transportation and the invention of countless labor-saving devices opened up a field to practical skill which had before been unknown, and thus made a complete revolution, if not in the general character of the problem, yet in the conditions of its solution. With every enlargement in the organization, with every improvement in the machinery of production, with the discovery of every new field for the purchase of material and every new market for the sale of the commodity, arise a number of new problems the correct solution of which determines the success or failure of the whole organization.

All this does not of itself render the problem of economical production and sale intrinsically more difficult. The old managers can go on purchasing material, making it up and selling it on the old plan, without necessarily causing any disturbance in the course of their business. The important point is that every improvement of the kind we have alluded to opens up a new and wide field for increasing the productiveness of labor, which can be worked to the best advantage only by those who possess in the highest degree the faculty of economizing money and labor, combined with that tact and insight which insure their always doing what is best under existing circumstances. The manager of a modern shoe factory who keeps himself acquainted with the fluctuations of the various markets in which he can purchase his leather and other raw material, who knows what plan to adopt in order to secure the good quality of everything he purchases—in a word, who can always buy the right thing at the right time and in the right place—will waste far less of the money of the organization than another of less commercial

tact. Then in conducting the affairs of the factory and selling its products it will be found that at the end of every year a large aggregate upon the debit side of the account is due to waste of material, waste of labor through imperfect co-operation among the hundreds of operatives, losses from not having made what was most in demand, and scores of other agencies not possible to enumerate, but all arising from those imperfections in general supervision which no amount of skill can entirely avoid. Then there are lost opportunities to be lamented when too late, by taking advantage of which profitable bargains might have been made. A device which would have been successful has been rejected, to be afterwards adopted by a rival manager, and money has been wasted on devices which have proved unprofitable. The power of economizing the wear and tear of his machinery, of securing it against accident or deterioration, of making the best use of waste material, comes in as an important factor of success. The manager who has the tact to take advantage of all such opportunities, to reduce all mistakes of these kinds to a minimum, and to foresee every chance for a favorable disposition of the products of his establishment, will be able to pay his employés steadier wages than any one else, offer the public as good bargains as his competing neighbor, and have a large margin of profit at the end of every year, altho his less skilful neighbor may have worked at a loss. He does this not by any sharp practice at the expense of the public, not by any peculiar faculty of getting hold of the wealth which some one else has produced, but by so economizing the labor, money, and appliances of which he has control as to make them produce more articles and articles better adapted to the wants of the public than they would produce under less skilful management.

Having brought together these comparative views of our own industrial system and the corresponding system of the past, the truth of some general propositions on which we must base our conclusion respecting the future will be plain. Leaving all sentiment aside, it must be considered that the part played in production by the skill of the ordinary workman, or by such acquired powers as are attainable by all through a system of training, constantly diminishes. The organization and its di-

recting head increase in importance from year to year, and this increase is necessarily accompanied by a diminution in the relative importance of the parts which are organized. Everywhere there is a call for the care and skill which is possessed only by a few. Even where little co-operation is required, the use of more refined materials and more delicate instruments requires greater skill and care on the part of those who are responsible. As more skill becomes required of the managing head, the test through which one must pass to attain that position becomes more and more severe. The individual workman desiring to make and sell his products directly to the public finds his sphere growing narrower and the necessity of his becoming an insignificant factor in some organization constantly increasing. When the question is whether a projected factory shall succeed or fail, the difficulties of the calculation are found to lie in estimating the probable sales, the amount of business, the cost of material, the efficiency of machinery, and the source of supply, rather than in estimating the skill of the operatives.

One conclusion which requires little argument to enforce it is that those current discussions of the labor question in which labor and capital are considered the sole factors of production are entirely insufficient, in that they omit a third factor of equal importance with the other two—that of organizing skill. The latter, instead of being a subordinate element, is really that one of the three which it is in many branches of production most difficult to command. We call to mind the economic principle that the market value of a requirement depends not only upon its usefulness, but also upon the difficulty of commanding it. It is true that labor is the very first requirement of all industry, without which no production of wealth would be possible. The laborer is as necessary to the exercise of skill by the manager as air is to human life. But altho air is a necessity of existence, it has no market value because an ample supply is always at command without trouble. Now if we measure the three factors which we have described by the same rule, we find that so far as difficulty of commanding the requirements of industry is concerned, the easiest factor of all to obtain is simple labor, skilled or unskilled; the next most difficult is capital, and the most difficult of all is organizing and directing skill. There are

plenty of laborers in every branch of industry anxious to find employment at remunerative prices. There is plenty of capital in the market ready to lend itself to labor and skill whenever the latter can promise a return of the value. But for every additional demand we make upon skill, and especially upon organizing and managing skill, we find the market to grow tighter. The unskilled labor of idle men who have been taught no pursuit is clamoring for an employer. Where proved integrity and mechanical skill are required, the supply becomes more limited; when a mechanical tact which can be gained only by long years of assiduous application is required, some search must be made for it; when the manager is one who will be certain to conduct a great business with success against all competition, happy is the capitalist who can find him or the laborer who can enlist under him.

The difficulty of commanding managing skill arises not less from its actual scarcity than from the difficulty of recognizing it. Undoubtedly if an establishment should advertise for a competent manager at a very large salary, applications might be numerous and each applicant might claim to possess the necessary qualifications. But he would find it hard to prove his claim. There is no such difficulty in the case of labor and capital. If the workman says, "Here is labor," the truth of his claim can be ascertained by a very simple inspection. If he says, "Here is mechanical skill," a brief trial will be necessary and sufficient for the test. When a capitalist says, "Here is money," he has no difficulty in proving the amount to his credit on the books of the bank. But who can say, "Here is business ability—here is one who can be trusted to manage machinery worth a million dollars so that no damage shall happen, and to receive and spend thousands of dollars a day in the most economical manner"?

At the first glance the aspect of things which we have presented appears altogether on the side of those who take a gloomy view of the present and immediate future of society, and especially of the prospects for the improvement of the masses and of the effects upon them produced by our changed system of industrial organization. Among those benevolent men whose philanthropy embraces the lowest as well as the highest grades

of their race there is a wide-spread feeling that the lower orders in the industrial organizations do not get the fair share of what they produce. This impression is strengthened by false economical notions current even among educated men respecting the true working of our system. At the bottom of all the fallacies is the old-fashioned habit of looking upon labor not merely as one of the original necessary factors of wealth, but also as furnishing the sole means of measuring it. It is supposed that the community of, we may suppose, ten millions of steady workers can produce by their exertions a certain definite amount of wealth, and that the fundamental question is not, How much can this community produce? but, How shall its product be divided? The natural conclusion is that if one man is found to get a thousand dollars while another gets only fifty, these two amounts do not represent their relative productiveness, but only the superior skill of the former in so arranging the division as to secure himself a larger share. Quite possibly all that we have said of the great importance of managing skill may be favorably received by many who will yet accept our views with the impression that, after all, this skill consists principally in an occult power of putting into one's own pocket the money gained by the labor of thousands of others. From this point of view the principal talent of the manager would not be really directed toward increasing the amount of wealth produced, because that, being measured by labor, depends altogether upon the work of laborers. His extraordinary power would therefore consist in the art of distributing the wealth produced by the whole organization so that he should get the larger share. That any one man should be an actual producer of millions of dollars seems to them incredible. This view is so deeply set in that silent substratum of feeling upon which our current ideas rest that it may be worth while to illustrate more fully the true functions of the manager as a producer of wealth and a promoter of industrial efficiency.

First we suppose a state of things as it was before labor was organized. The shoemakers of a community, working independently, each man in his own little shop, can each make a pair of boots in two days. They charge $4 for their labor on each pair, thus earning $2 per day.

Manager A now appears on the scene and organizes the labor

of twenty men under his direction in such a way that they can together make twelve pairs a day. We may suppose him to pay the men the same amount they earned before, making $40 per day in all, and to sell the shoes at the same price, thus receiving $48 per day as the product of the establishment. He thus earns for himself $8 per day by skill in managing. His operatives gain the same amount as before and the public purchase their boots at the same price as before, so that no one is any worse off. Practically his skill proves equivalent to the producing power of four men.

Manager B next appears and combines the labor of forty men in such a way that they can make 28 pairs a day. If he pays the same wages, and sells the product at the same price, he will pay out $80 per day and receive $112, thus gaining $32 as the reward of his skill. Still the community is neither better nor worse off, the operatives earn the same wages, and the public buy their shoes at the same price as before.

A third manager appears, and, having the advantage of a wider market both for the purchase of materials and the sale of the products, employs a larger force and produces a number of shoes in a yet greater proportion. The number is, in fact, so great that they can no longer be disposed of at the old price of $4 per pair; so he reduces the price to $3. This introduces competition, and such of his competitors as are not equally skilful must be content with smaller profits or must retire from business. The public at large are now benefited by getting their shoes cheaper, and the operatives are no worse off because they command the same wages as before.

The ultimate result will be a state of things in which only managers of the highest skill will remain in business, and the best of these will earn considerable incomes because their skill is necessary to the efficiency of a large body of workmen, and to the production of a great amount of wealth at the least cost. *Under no circumstances can they earn more than they save the community*, because competition in their business is as free as in any other, and the community always has the choice of refusing their services and reverting to old-fashioned methods of production. As a matter of fact the income of the manager has, by

competition and by the general diffusion of the knowledge gained through the experience of men engaged in manufactures, been brought down to a small fraction of the sum saved to the community by organization.

We are now enabled to reach a generalization which embodies a fundamental principle of political economy. Each individual who, by virtue of special powers of any kind, can in any way increase the effectiveness of the labor of others is practically a producer of all the additional wealth he enables them to acquire. The effect is the same whether he operates by directing their labor, by placing facilities within their reach which they could not have commanded without him, by inventing new methods of production, or by showing them how to avoid waste. In any case wealth which would otherwise not have existed or have gone to waste is through him produced, saved, or made available. There is no limit to the possible amount which a single person may thus indirectly produce, and there is therefore no amount which we can pronounce too great to be earned by him.

The illustrations we have drawn from the management of factories are by no means those in which the productive powers of organizers are exhibited on the largest scale. To find where the greatest opportunities are offered for increasing the saving or producing powers of whole cities or states, we must take great mercantile or railway enterprises. The question whether a railway shall sink the millions of dollars invested in its construction or enable whole cities, counties, or states to supply their wants and find a market for their products depends entirely upon whether its projector has correctly calculated the effect of all the conditions on which success depends. If he does this, he may make an addition of one, five, or fifty per cent to the effective productiveness of a million of people. If he does not possess the almost unique powers required, the whole enterprise may be a waste of money.

We may now reach a generalization connecting the functions of the organizer which we have described with the general cheapening of production. There is no essential difference between the direct economical effects of labor-saving machines, of

cheap foreign labor, and of the improved system of organization and management which we have described. The one essential feature of all is that a greater product is produced with the same amount of labor, or, which amounts to the same thing, a given product is produced with less labor.

There is therefore no soundness in the position of those who make a distinction between these different factors. To all intents and purposes a Chinaman is, in his relations to the Anglo-Saxon, simply a labor-saving machine. Any instrumentality which does two dollars' worth of labor at an expenditure of one dollar in food or fuel is, so far as all the rest of the community is concerned, a labor-saving machine, no matter whether made of brass and steel or of bone and muscle: no matter whether the fuel consumed is wood, coal, or human food. All such instrumentalities are in the first place attacked by the laboring classes whose interests are affected, and only tolerated after long experience of the futility of the contest. If horses had been unknown and their labor performed by men, their subsequent introduction and use would have produced the same effect as Chinese labor in California, and have been resisted by the same arguments.

One practical lesson to be drawn from our study of the functions of the managers is that of the difficulties which stand in the way of the co-operative system. At first sight nothing seems simpler than that a body of men working together should dispense with the services of a head who absorbs an undue share of the product. If he is not a producer, why not get along without him? Yet with all the complaints of the laborer that he fails to secure a proper return, we rarely hear of efforts to improve his condition in what seems to be the only practical way, that of performing the functions of manager and capitalist himself; and what we do hear is mostly the history of failures. This shows conclusively that the laboring classes cannot succeed without the help of the very men and agencies which their professed friends denounce most loudly, and such being the case, it is futile to complain of the power of these men and agencies.

That no such thing as a successful co-operative system is

possible we by no means assert. The only difficulty is that to put such a system into successful operation requires a certain amount of organizing talent and business foresight, and these are the very qualities which the laboring classes do not possess, because under present conditions every one of their number who does possess them can rise upward in the scale. Perhaps the lack of these necessary qualities will be most clearly seen by studying the form which efforts at co-operation commonly take; namely, the establishment of stores for retailing goods. Buying and selling is perhaps the business least adapted to being successfully pursued without a responsible managing head. If there is anything wrong in our present retail system, it is the excessive number of small retail shops which must sell at a considerable profit in order to yield a living to their proprietors. Yet the efforts to which we allude look to little more than increasing the number of these nearly superfluous shops by starting anumber of new ones, to be the property of the persons they supply.

An intelligent survey of the field would show that if, as seems not improbable, the profits paid by the purchasers at retail to the dealer are greater than the real necessities of the case demand, this can only arise from the great number of small dealers who are supported under the present system. The only remedy, therefore, is either to substitute a single large establishment for great numbers of small stores, or to adopt some new system in which the practice of exposing goods for sale to chance customers shall be entirely abolished, and each co-operator shall be supplied at stated intervals with designated quantities of each commodity. The first plan is that of the great co-operative stores of England, the success of which depends on the assured custom of some large class of the community, such as the civil officers of the government, and the avoidance of all bad debts by selling only for cash. The second requires a concert of action among small consumers, the very ability to effect which requires talent of an order which would command a high price in industrial life, and which we may therefore assume that the classes to be benefited do not possess. On the whole, we must accept the conclusion that the time when managing heads

can either be dispensed with or made to sell their services at a cheaper rate than they now do is very far in the future. It will come only by a wider diffusion of general mental power, or a cessation of improvement consequent upon the discovery of the best way of producing and distributing goods of every class.

SIMON NEWCOMB.

THE RESURRECTION OF CHRIST: THE TEST OF CHRISTIANITY.

IF I could believe the resurrection," said Spinoza, "I would become a Christian at once." The great Jewish philosopher was right. The resurrection of Christ and the existence of Christianity must stand or fall together. The Christian Church rests on the resurrection of its Founder. Without this fact the church could never have been born, or, if born, it would soon have died a natural death. If Christ was raised from the dead, then all his other miracles are sure, and our faith is impregnable; if he was not raised, he died in vain, and our faith is in vain. It was only his resurrection that made his death available for our atonement, justification, and salvation; without the resurrection his death would be the grave of our hopes; we should be still unredeemed and under the power of our sins. A gospel of a dead Saviour would be a contradiction and wretched delusion. This is the reasoning of St. Paul, and its force is irresistible.

The resurrection of Christ is therefore emphatically a test question upon which depends the truth or falsehood of the Christian religion. It is either the greatest miracle or the greatest delusion which history records. Ewald makes the striking remark that the resurrection is "the culmination of all the miraculous events which are conceivable from the beginning of history to its close."

Christ had predicted both his crucifixion and his resurrection, but the former was a stumbling-block to the disciples, the latter a mystery which they could not understand till after the event. They no doubt expected that he would soon establish his Messianic kingdom on earth. Hence their utter disappointment and

downheartedness after the crucifixion. The treason of one of their own number, the triumph of the hierarchy, the fickleness of the people, the death and burial of the beloved Master, had in a few hours rudely blasted their Messianic hopes and exposed them to the contempt and ridicule of their enemies. For two days they were trembling on the brink of despair; but on the third day, behold! the same disciples underwent a complete revolution from despondency to hope, from timidity to courage, from doubt to faith, and began to proclaim the gospel of the resurrection in the face of an unbelieving world and at the peril of their lives. This revolution was not isolated, but general among them; it was not the result of an easy credulity, but brought about in spite of doubt and hesitation; it was not superficial and momentary, but radical and lasting; it affected not only the apostles, but the whole history of the world. It reached even the leader of the persecution, Saul of Tarsus, one of the clearest and strongest intellects, and converted him into the most devoted and faithful champion of this very gospel to the hour of his martyrdom.

This is a fact patent to every reader of the closing chapters of the Gospels, and is freely admitted even by the most advanced sceptics.

The question now rises whether this inner revolution in the life of the disciples, with its incalculable effects upon the fortunes of mankind, can be rationally explained without a corresponding outward revolution in the history of Christ; in other words, whether the professed faith of the disciples in the risen Christ was true and real, or a hypocritical lie, or an honest self-delusion.

There are four possible theories which have been tried again and again and defended with as much learning and ingenuity as can be summoned to their aid. Historical questions are not like mathematical problems. No argument in favor of the resurrection will avail with those critics who start with the philosophical assumption that miracles are impossible, and still less with those who deny not only the resurrection of the body but even the immortality of the soul. But facts are stubborn; and if a critical hypothesis can be proven to be psychologically and historically impossible and unreasonable, the result is fatal to the philosophy which underlies the critical hypothesis. It is

not the business of the historian to construct history from preconceived notions and to adjust it to his own liking, but to reproduce it from the best evidence and to let it speak for itself. Facts in history, as phenomena in nature, are stubborn and must overrule speculations and conjectures.

1. The HISTORICAL view is presented by the Gospels, believed in the Christian church of every denomination and sect, and is incorporated in the institution of the "Lord's day," which commemorates the resurrection of Christ as the crowning miracle and divine seal of his whole work, as the foundation of the hope of believers and the pledge of their future resurrection. According to this theory the resurrection of Christ was an actual tho miraculous event, in harmony with his previous history and character, and in fulfilment of his own prediction. It was a reanimation of the dead body of Jesus by a return of his soul from the spirit-world, and a rising of body and soul from the grave to a new life, which, after repeated manifestations to believers during a short period of forty days, entered into glory by the ascension to heaven. The object of the manifestations was not only to convince the apostles personally of the resurrection, but to make them witnesses of the resurrection and heralds of salvation to all the world.

Truth compels us to admit that there are serious difficulties in harmonizing the accounts of the evangelists, and in forming a consistent conception of the nature of the resurrection-body, hovering as it were between heaven and earth, and oscillating for forty days between a natural and a supernatural state; of a body clothed with flesh and blood and bearing the wound-prints, and yet so spiritual as to appear and disappear through closed doors and to ascend visibly to heaven. But these difficulties are not so great as those which are created by a denial of the fact itself. The former can be measurably solved, the latter cannot. We do not know all the details and circumstances which might enable us to clearly trace the order of events; but among all the variations the great central fact of the resurrection itself and its principal features, as Dr. Meyer, one of the fairest and ablest exegetes, observes, "stand out all the more sure." The period of the forty days is, in the nature of the case, the most mysterious in the life of Christ, and transcends all ordinary

Christian experience. The christophanies resemble in some respects the theophanies of the Old Testament, which were granted only to few believers, yet for the general benefit. At all events, the fact of the resurrection furnishes the only key for the solution of the psychological problem of the sudden, radical, and permanent change in the mind and conduct of the disciples; it is the necessary link in the chain which connects their history before and after that event. Their faith in the resurrection was too clear, too strong, too steady, too effective to be explained in any other way. They showed the strength and boldness of their conviction by soon returning to Jerusalem, the post of danger, and founding there, in the very face of the hostile Sanhedrim, the mother-church of Christendom.

2. The THEORY OF FRAUD. The apostles stole and hid the body of Jesus, and deceived the world.

This theory was invented by the Jewish priest who crucified the Lord, and knew it to be false (Matt. 27 : 62–66; 28 : 12–15). The lie was repeated and believed, like many other lies, by credulous infidels, first by malignant Jews at the time of Justin Martyr, then by Celsus, who learned it from them, but wavered between it and the vision-theory, and was renewed in the eighteenth century by Reimarus in the Wolfenbüttel Fragments. More recently Salvador, a French Jew, has tried to prove that Jesus was justly crucified, and was saved by the wife of Pilate through Joseph of Arimathæa or some Galilean women; that he retired among the Essenes and appeared secretly to a few of his disciples.

This infamous lie carries its refutation on its face: for if the Roman soldiers who watched the grave at the express request of the priests and Pharisees were asleep, they could not see the thieves, nor would they have proclaimed their military crime; if they, or only some of them, were awake, they would have prevented the theft. As to the disciples, they were too timid and desponding at the time to venture on such a daring act, and too honest to cheat the world. And finally a self-invented falsehood could not give them courage and constancy of faith for the proclamation of the resurrection at the peril of their lives. The whole theory is a wicked absurdity, an insult to the common-sense and honor of mankind.

3. The SWOON-THEORY. The physical life of Jesus was not extinct, but only exhausted, and was restored by the tender care of his friends and disciples, or (as some absurdly add) by his own medical skill: and after a brief period he quietly died a natural death.

This theory was ably advocated by Paulus of Heidelberg (1800), and modified by Gfrörer (1838), who afterwards became a Roman Catholic. We are pained to add Dr. Hase (*Gesch. Jesu*, 1876, p. 101), who finds it necessary, however, to call to aid a "special providence" to maintain some sort of consistency with his former advocacy of the miracle of the resurrection, when he truly said ("Leben Jesu," p. 269, 5th ed. 1865): "The truth of the resurrection rests unshakably on the testimony, yea on the existence of the apostolic church."

Josephus, Valerius Maximus, psychological and medical authorities have been searched and appealed to for examples of such apparent resurrections from a trance or asphyxy, especially on the third day, which is supposed to be a critical turning-point for life or putrefaction.

But besides insuperable physical difficulties—as the wounds and loss of blood from the very heart pierced by the spear of the Roman soldier—this theory utterly fails to account for the moral effect. A brief sickly existence of Jesus in need of medical care, and terminating in his natural death and final burial, without even the glory of martyrdom which attended the crucifixion, far from restoring the faith of the apostles, would have only in the end deepened their gloom and driven them to utter despair. Strauss and Keim have admirably and effectually refuted this theory of the older Rationalism which the Germans call the "rationalismus vulgaris."

4. The VISION-HYPOTHESIS. Christ rose merely in the imagination of his friends, who mistook a subjective vision or dream for actual reality, and were thereby encouraged to proclaim their faith in the resurrection at the risk of death. Their wish was father to the belief, their belief was father to the fact, and the belief, once started, spread with the power of a religious epidemic from person to person and from place to place. The Christian society wrought the miracle by its intense love for Christ. Accordingly, the resurrection does not belong to the

history of Christ at all, but to the inner life of his disciples. It is merely the embodiment of their reviving faith.

This hypothesis was invented by Celsus, a heathen adversary in the second century, and soon buried out of sight, but was again suggested in a more respectable form by Spinoza in the seventeenth, and after a second burial it rose to a new life in the nineteenth, under the lead of Strauss and Renan, and spread with epidemical rapidity among sceptical critics in Germany, France, Holland, and England. It is now the favorite hypothesis, altho there are indications within the Tübingen school in its latest developments that it will soon share the fate of its predecesssors. Among English writers the anonymous author of "Supernatural Religion" (which is already passing through the seventh edition) is its chief champion, and states it in these words: "The explanation which we offer, and which has long been adopted in various forms by able critics" [among whom, in a foot-note, he falsely quotes Ewald], "is, that doubtless Jesus was seen (ὤφθη), but the vision was not real and objective, but illusory and subjective; that is to say, Jesus was not himself seen, but only a representation of Jesus within the minds of the beholders." Renan ascribes to Mary Magdalene the chief agency in creating and spreading this delusion, and says with shocking profanity, "*La passion d'une hallucinée donne au monde un Dieu resuscité!*"

The advocates of this hypothesis appeal first and chiefly to the vision of St. Paul on the way to Damascus, which occurred several years later, and is nevertheless put by him on a level with the former appearances to the older apostles (1 Cor. 15 : 8). The next support is derived from supposed analogies in the history of religious enthusiasm and mysticism, such as the individual visions of St. Francis of Assisi, the Maid of Orleans, St. Theresa (who believed that she had seen Jesus in person with the eyes of the soul more distinctly than she could have seen him with the eyes of the body), Swedenborg, even Mohammed, and the collective visions of the Montanists in Asia Minor, the Camisards in France, the spectral resurrections of the martyred Thomas à Becket of Canterbury and Savonarola of Florence in the excited imagination of their admirers, and finally the apparitions of the Immaculate Virgin at Lourdes. The author of

"Supernatural Religion" calls to aid even Luther's vision of the devil on the Wartburg, when the reformer threw the inkstand at him, and Lord Byron's appearance after his death to Walter Scott in clear moonshine!

Nobody will deny that subjective fancies and impressions are often mistaken for objective realities. But with the exception of the case of St. Paul—which on closer investigation turns out to be, even according to the admission of the leaders of sceptical criticism (such as Dr. Baur), a powerful argument against the mythical or visionary theory—these supposed analogies are entirely irrelevant; for, not to speak of other differences, they were isolated and passing phenomena which left no mark on history; while the faith in the resurrection of Christ has revolutionized the whole world. It must therefore be treated on its own merits as an altogether unique case.

(*a*) The first insuperable argument against the vision-theory and in favor of the objective reality of the resurrection is the empty tomb of Christ. If he did not rise, his body must either have been removed or remained in the tomb. If removed by the disciples, they were guilty of a deliberate falsehood in preaching the resurrection, and then the vision-hypothesis gives way to the exploded theory of fraud. If removed by the enemies, then those enemies had the best evidence against the resurrection, and would not have failed to produce it, and thus to expose the baselessness of the vision. The same is true, of course, if the body had remained in the tomb. The murderers of Christ would certainly not have missed such an opportunity to destroy the very foundation of the hated sect.

To escape this difficulty, Strauss removes the origin of the illusion away off to Galilee, whither the disciples fled; but this does not help the matter, for they returned in a few weeks to Jerusalem, where we find them all assembled on the day of Pentecost.

This argument is fatal even to the highest form of the vision-hypothesis, which admits a *spiritual* manifestation of Christ from *heaven*, but denies the resurrection of his body. This form is advocated by Ewald, Schenkel, and Keim, but is admitted by Keim, and quite recently also by Schenkel (in his *Christusbild der Apostel*, 1879), to be a mere hypothesis which by no means solves all the difficulties of the problem.

(*b*) If Christ did not really rise, then the words which he spoke to Mary Magdalene, to the disciples of Emmaus, to doubting Thomas, to Peter on the lake of Tiberias, to all the disciples on Mount Olivet, were likewise pious fictions. But who can believe that words of such dignity and majesty, so befitting the solemn moment of the departure to the throne of glory, as the commandment to preach the gospel to every creature, to baptize the nations in the name of the Father, the Son, and the Holy Spirit, and the promise to be with his disciples alway to the end of the world—a promise abundantly verified in the daily experience of the church—could proceed from dreamy and self-deluded enthusiasts or crazy fanatics any more than the Sermon on the Mount or the Sacerdotal Prayer! And who, with any spark of historical sense, can suppose that Jesus never instituted baptism, which has been performed in his name ever since the day of Pentecost, and which, like the celebration of the Lord's Supper, bears monumental testimony to him every day as the sunlight does to the sun!

(*c*) If the visions of the resurrection were the product of an excited imagination, it is unaccountable that they should suddenly have ceased on the fortieth day (Acts 1: 15), and not have occurred to any of the disciples afterwards, with the single exception of Paul, who expressly represents his vision of Christ as "the last." Even on the day of Pentecost Christ did not appear to them, but, according to his promise, "the other Paraclete" descended upon them; and Stephen saw Christ in heaven, not on earth.

(*d*) The chief objection to the vision-hypothesis is its intrinsic impossibility. It makes the most exorbitant claim upon our credulity. It requires us to believe that many persons, singly and collectively, at different times, and in different places, from Jerusalem to Damascus, had the same vision and dreamed the same dream; that the women at the open sepulchre early in the morning, Peter and John soon afterwards, the two disciples journeying to Emmaus on the afternoon of the resurrection-day, the assembled apostles on the evening in the absence of Thomas, and again on the next Lord's day in the presence of the sceptical Thomas, seven apostles at the lake of Tiberias, on one occasion five hundred brethren at once, most of whom were

still alive when Paul reported the fact, then James, the brother of the Lord, who formerly did not believe in him, again all the apostles on Mount Olivet at the ascension, and at last the clear-headed, strong-minded persecutor on the way to Damascus—that all these men and women on these different occasions vainly imagined they saw and heard the self-same Jesus in bodily shape and form; and that they were by this baseless vision raised all at once from the deepest gloom in which the crucifixion of their Lord had left them, to the boldest faith and strongest hope which impelled them to proclaim the gospel of the resurrection from Jerusalem to Rome to the end of their lives! And this illusion of the early disciples created the greatest revolution not only in their own views and conduct, but among Jews and Gentiles and in the subsequent history of mankind! This illusion, we are expected to believe by these unbelievers, gave birth to the most real and most mighty of all facts, the Christian Church, which has lasted these eighteen hundred years, and is now spread all over the civilized world, embracing more members than ever, and exercising more moral power than all the kingdoms and all other religions combined!

The vision-hypothesis instead of getting rid of the miracle only shifts it from fact to fiction; it makes an empty delusion more powerful than the truth, or turns all history itself at last into a delusion.

Before we can reason the resurrection of Christ out of history, we must reason St. Paul and Christianity itself out of existence. We must either admit the miracle, or frankly confess that we stand here before an inexplicable mystery.

PHILIP SCHAFF.

POLITICAL ECONOMY A SCIENCE—OF WHAT?

IS Political Economy a science? and if so, a science of what? are two questions strenuously disputed—the latter among economists themselves, whose attempted definitions of it are so various, inconsistent, or inadequate as to tempt not only the many unversed in it, but even so eminent a writer on the subject as Professor Bonamy Price to deny the former. In his recent very able work on "Practical Political Economy," he earnestly and ingeniously contends that it is not a science. While this is a very common notion of those wholly or partially ignorant of the subject, owing to the debate and uncertainty which they suppose cloud nearly every economic question, the great body of standard authors upon it, since it has become a distinct and prominent department of human research, have treated it as a science; and this none the less, altho they have so largely failed to come to an agreement as to its exact sphere and scientific definition. In this we think they are right. It seems to us that the principal arguments to the contrary, if valid, are also valid against some of the principal mental and physical sciences, if not against the very being of Science and Philosophy as such.

1. The chief of these arguments, so far as they have come to our notice, is that political economy "is the application of common-sense to familiar processes." But if this destroys its scientific character, then it sweeps away nearly all the mental and sociological, and no small part of those commonly called physical sciences. For what operations are more familiar than those of the human mind? They are the phenomena of consciousness, *i.e.*, of what men are conscious of, or having, know that they so have them. So the Scotch psychology and meta-

physics of Reid's school assumed the title of the Philosophy of Common-Sense, because they were distinguished for rejecting all philosophic fictions contradictory to the intuitive judgments of mankind, re-establishing the normal authority of these, and analyzing their proper content and logical implications. So all sound works on mental science deal with the facts of human consciousness, and attempt to evolve explicitly what these involve implicitly. Let whoever doubts this read that late work of Dr. McCosh on "The Emotions," so marvellously keen and penetrating in its analysis, yet so replete with live illustrations from facts familiar to all; and all the more attractive and readable because so enlivened by that genius whose prerogative it is, as Coleridge says, "to produce novel impressions from familiar objects."

Sydney Smith, in that style of paradox by which he was so fond of giving piquancy to his utterances, observes that "it fares worse with this science (metaphysics) because its aims and extravagances are comprehended by so many. If you tell a man that the ground on which he stamps is not ground, but an idea, he naturally enough thinks you mad. If the same persons were told that the planets were rolled about in whirlpools, or that the moon, as Descartes thought, was once a sun —such a person who would laugh at the former might hear these latter opinions advanced without being struck with their absurdity. Every man is not necessarily an astronomer, but every man has some acquaintance with the operations of his own mind, and you cannot deviate grossly from the truth in these subjects without incurring his ridicule and reprehension."

But even many of the physical sciences are largely conversant with familiar objects with which men have always had to do, such as air and water, heat and light, tides and currents, levers, wheels, pulleys, wedges, projectiles, plants and animals, and so on indefinitely; and not merely with such matters in the general, but in many of their modes of operation which science takes note of, sometimes as things to be proved, sometimes as contributing to the proof of higher laws under which they are generalized. Such was the falling of an apple to Newton's eye, who saw in it the universal law of gravitation which, thus sug-

gested, he proceeded, by the requisite observations and experimental tests, to prove. What more than this was that suspicion of an expansive force in the steam issuing from a tea-kettle, which, being proved, has made water vaporized by heat the great motor of modern times, and with electricity the propulsive material forces of modern civilization?

2. It is argued by Professor Price that "what are called economic laws are mere tendencies." So far as *pure* economics, saying nothing here of its applications, is concerned, this is freely granted by some of the best economic writers, who none the less vindicate the claim of political economy to the rank of a science. But the proof of tendencies towards certain conditions or results which, unless counteracted, will issue in them, is as much a scientific achievement as any scientific discovery or induction whatever. What are all the laws of nature, all mechanical and chemical laws or forces, nay, laws of organic life also, but tendencies to modes and results of action sure to take effect, unless counteracted by opposite or modifying forces, as they so often are? The simplest diagonal force in mechanics is a good illustration. What is a perfect chronometer, what are all machinery, engineering, and architecture, but devices for adjusting and balancing forces or tendencies wholly or partially concurrent, or antagonistic, so as to neutralize whatever tends to hinder the result arrived at?

As to the mental and moral sciences, so far as they respect events dependent on the human will influenced on the one hand by the manifold views and appetencies which sway its decisions, and hemmed in on the other by ever-varying external conditions, nothing can be known beyond tendencies. Laws in plenty may be ascertained and propounded with certainty as to what is normal, intellectual, and moral action; what men ought to be, what they ought to do in general. The same is true in economics. But as to the most efficient modes of carrying out these laws, these may vary according to the attendant opportunities or impediments. For example, so far as events are concerned which depend on the human will, for whose guidance in action ethics, politics, jurisprudence, theology, nearly all the sociological sciences furnish principles and rules, they give us no means of prevision of the future beyond tendencies to such

events, which will take effect in the absence of counteracting tendencies. We may calculate and predict general average results, but nothing more. But what can be more important than such knowledge of tendencies and counter-tendencies? As money is abundant or scarce, prices tend to rise or fall. If credit, operating as a purchasing power, be inflated, it acts still further in raising prices. But if, in consequence of being overstrained, it collapses, not only does this stoppage of purchasing power of itself shrink prices; it more than counteracts the tendency of abundant money to raise them, by throwing it temporarily out of use, and making it as tho it were not, because locked up in unavailable hoards. So, while financial or economical tendencies may certainly be ascertained to be the result of certain conditions uncounteracted, which of these conditions, whether antagonistic or concurrent, may arise, can rarely with certainty be forecast.

3. This disposes of another objection to economics ranking as a science; to wit, that it is powerless to predict the future course of production and commercial vicissitudes with any certainty. Of course it is. It is none the less true and important that "the hand of the diligent maketh rich," *i.e.*, has this tendency so surely that we can forecast the probable result, while a thousand unforeseen disasters, like war, pestilence, bad harvests, fire or flood, may more than destroy the normal fruits of a year's industry. Can we not with reasonable certainty predict divers disastrous consequences of flooding the country with irredeemable currency, however they may be mitigated by unforeseen counter-influences? Can we not foresee the effect of conducting legislation upon the assumption that money is the only wealth, the basis of the exploded commercial system, and of much that is now erratic in private schemes and public legislation?

Nor, again, is it any proof against economics being a science that its votaries dispute often about some of its principles or their application. No sciences are free from such contentions unless the apodictic and formal. While these contain a preponderating body of truths undisputed and indisputable, yet even they have their disputed sides. The physical sciences present one vast battle-field of contestants between evolutionism and

creationism, about ultimate molecular atoms or forces, or centres of force, which quite bewilder the uninitiated. On the psychological and metaphysical side, what end have we of disputes between sensationalists, associationists, utilitarians, intuitionalists, and so on, to the end of the chapter? Nor does even the climacteric science of theology fare better; yet it would be the climax of childish weakness to maintain that this is any warrant for scepticism, or that no light has been gained upon these subjects by the scientific study of them, or that a great and precious body of truth has not been thereby opened up, clarified, and confirmed; and this altho little remains that some even respectable writer may not be found to dispute. No science is built up to perfection in any one age, or by any one man or set of men, or so that some of its principles may not be disputed in some quarters. It is in the light gained by the observations and discoveries of those investigating in support of false hypotheses, that progress is made towards truer systems. It has been well observed that the Copernican system could not have been reached without the aid of the discoveries made by the Ptolemaists. Reid advanced in the light of the truths and errors of his predecessors, while he retained or put forth many crudities requiring to be cleared up by his successors, before his system was at all perfected.

Much less is the claim of economics to the rank of a science disproved by the disagreement of its leading authors as to the proper definition of it. If disagreement here could disprove its scientific character, then scarcely a plurality of sciences, if any science at all, is left. If we take pure logic, which is, next to mathematics, the most apodictic of the sciences, and unfolds the laws of definition, it is variously defined by principal authors: by Whately as the "science of reasoning," and "wholly conversant about language," a doctrine denounced without stint by Hamilton, who, followed substantially by Mansel and Thompson, pronounces it the science of the "laws of thought as thought;" Dr. McCosh defines it "the science of the laws of 'discursive thought;'" while J. S. Mill, noting the great diversity in the modes of defining logic, in the Introduction to his great work on the subject, styles it "the science of proof or evidence." Mr. Mill profoundly observes, that while good definition is

logically the first step in any science, it is actually and necessarily the last, because it cannot exceed the measure of our knowledge, and cannot therefore become complete till that becomes complete. It is very apt to reflect the aspect or side of the subject uppermost in the mind of him who gives it. The definitions given of political economy by its great expounders are no more numerous or conflicting than those of logic, a science of apodictic certainty, and one to which everything truly scientific must conform; nay, they are less so than those given of science itself by the leading authorities. All definitions of any science in its immature state are necessarily provisional. This is evident enough to any one who will consult such articles as those on Science and Philosophy in Fleming's "Vocabulary of Philosophy," or almost any good encyclopedia.

While it is thus clear that diversities or imperfections in the definitions given by the authorities in any department of human thought or inquiry do not necessarily divest it of its title to the rank of science, it may be added that the variant definitions of political economy put forth by authorities of any weight are unusually few; that most of them, in spite of their defects, cover the more important phenomena with which it deals, or of which it gives, or seeks to give, a rationalized explanation—the what and the why, the *ὁτὶ* and *διοτι*, which constitute the subject-matter of this, as they do of every science. Notwithstanding this imperfection of definition, however, most tolerably informed people know very well what properly comes within the range of political economy, altho they cannot give the scientific definition of it, just as nearly all men know when the objects they see belong to the order of plants, animals, or men, altho they cannot give the logical definition of either class. They are possessed and regulated by the true idea of each, even if they cannot give its differential marks. It masters them if they have not mastered it.

What Professor Price represents political economy to be, by way of proving it not a science goes far to prove it such, however imperfectly developed. He says: "It is the application of common-sense to familiar processes. It explains their nature and manner of working. It analyzes and thinks out practices which are universal, except when thwarted by artificial theory.

The information which it acquires by observation and analysis it puts together in systematic form. Its teaching is contained in a body of methodical knowledge, which presents to the inquirer the chief facts and the real essence of these natural processes. He is made to understand them, each singly for itself, and all of them together as a connected whole." ("Prac. Pol. Economy," p. 15.)

If the essentials of what constitutes the science of grammar, psychology, logic, and ethics do not fall under these categories, the reason is not apparent to us. The establishment of the doctrine that some actions are intrinsically right, and obligatory because they are right, against Paley's doctrine that happiness is the sole motive, and expediency the supreme guide, of moral action; that "pleasures differ in nothing but continuance and intensity," and that "obligation is nothing more than an inducement of sufficient strength," is only the result of "analyzing and thinking out practices that are universal, except when thwarted by artificial theory," or a perverted bias. And what else is accomplished by logic?

Prof. Price says, with some justice, "The truths proclaimed by political economy are ultimate truisms—processes which have always been known to all the world; and when political economy has explained them, the hearer is apt to exclaim that every one knew that before. It is an excellent test of real economical teaching that it should leave the pupil in the perception that it is made up of familiar truisms." But is this so in any sense which does not pertain to the mental, to say nothing of the physical sciences? Strip the canons of the syllogism of technicalities, and let their real meaning in upon the average mind, what are they but truisms? Study Reid's Intellectual Powers or Locke on the Understanding, and while they have promulged some errors for subsequent thinkers to dissipate, yet what is the most valuable part of their contributions to mental science but rescuing truisms from the mists of theoretical subtleties, or vulgar misconception, in which they had been enveloped and lost sight of?

But if Prof. Price has not invalidated the title of political economy to a place among the sciences, however short of a perfected science it may be, he has, in our judgment, been quite

successful in showing the insufficiency of some chief historical and current definitions of it. These definitions, omitting those of occasional writers, who almost confound it with politics or general sociology, are chiefly three: that it is the science of wealth, the science of value, the science of exchange. As by value most writers mean exclusively value in exchange, so some of them, conspicuous among whom is Prof. Perry, make it at once the science of value and of exchange. "Political economy," says he in his "Elements," "is the science of exchanges, or, what is exactly equivalent, the science of value." Others, including such great authors as Adam Smith, J. S. Mill, and Mr. Senior, define it as the science of wealth, in some aspects of it, a word which Prof. Perry denounces as "the bane of political economy. It is the bog whence most of the mists have arisen which have beclouded the whole subject." The difficulty has been, that by wealth is understood amongst men, not mere services which leave no certain product that survives them, but commodities or material objects having utilities impressed upon them by human labor which survive that labor. The sum-total of these in a country constitutes its wealth. The sum-total of them of which an individual is the owner, or to which he has a legal title, constitutes his wealth. We agree, and shall show more fully, that wealth in this accepted sense of it is not coextensive with the sphere of political economy. But the same thing is easily shown by Prof. Price to be true of exchange and value in exchange. What is value? It is that in any material object impressed upon it by human labor, which men sufficiently desire to be willing to expend some labor to gain it. It depends upon two things: 1. That it cannot be had without labor; and 2. That it be so far an object of desire that one or more men are willing to bestow that labor to obtain it, either in the direct production of it, or the doing or making of what will purchase it in exchange. The mistake of making exchangeability the equivalent of value is that of putting one of the accidents of value for its essence. The essence of economic value is that utility in a material object which costs labor to produce it, and for which the party to whom it is valuable is willing to give that labor. It is true that, to a large extent, he obtains such things with least labor by purchasing them from some other maker of them, in di-

rect or indirect exchange for some service or product of his own. So to him, what he makes and gives in exchange for a commodity or service measures the value which he puts upon what he gets in return for it. Hence the science of political economy covers phenomena and human activities broader than those of mere exchangeable value. As Adam Smith said, and Prof. Price so ably proves, there is value in use as well as exchange. Yet we think Prof. Price goes to an extreme of subjectivity when he defines value as "a feeling," "a sense of attachment, of affection for a thing."

This is the etymological fallacy of assuming that nouns and verbs of the same root necessarily agree in meaning. No doubt, value in an object arises from the mind's valuing or having an esteem and desire for it. But it is in the object—the quality in it which excites desire, not the mind's feeling or desire. But this objective thing, whether labor or the product of labor, may have the essential elements of value irrespective of exchangeability. Many articles produced by farmers, and especially by frontiersmen, for their own comfort or sustenance, have value for them equal to all the labor they cost, altho they have no exchangeable value whatever, on account of distance from market. It is needless to multiply the instances in which this may be true of perishable or bulky articles that can be had only by human labor, and are indispensable to man and beast. We do not say that value might not be at once so extended and circumscribed by generic and differential adjuncts, that an adequate definition of political economy might be constructed with this as its central idea. And in cases of necessity it is often advisable to take a word vague and equivocal in common speech, and give it a more precise and technical signification for scientific use, as is done with Perception and Conception in psychology. But we have better means of a precise definition of economics than the word value, so justly condemned for such a purpose by Prof. Price. If there are any words to which economic usage gives an unambiguous meaning, they are Utility, Labor, Effort, Sacrifice. And this corresponds with their commonly accepted meaning. Out of these it seems to us possible to construct a definition of political economy more precise and adequate, at least, than any yet brought to our attention, and one,

too, which includes whatever is true in each of the other definitions we have specified.

Utility, as a term in economics (we have just here no reference to ethics), means whatever meets any want or gratifies any desire of man. Labor is human effort directed by the Reason and Will to the production of such utilities. (*Economics is the science of the phenomena arising from the desire of man to obtain the maximum of utilities which are the result of labor acting in some way on material objects, with the minimum of effort including sacrifice; and of the laws in accordance with which he can best attain this result consistently with the internal and external conditions to which he is subject.* Sometimes this effort or labor may be chiefly mental. This is provided for in the definition of labor itself, which is always mental in its source, spring, and guidance.

Applied to the efforts of men in organized society, whether to states seeking to increase their own material resources at least cost, or to further the efficiency and fruitfulness of their people's labors by appropriate legislation, it is POLITICAL ECONOMY. All thorough treatment of economics considers the individual man, and man in society; the desires that in these relations impel him to labor; and in what ways they impel him to labor for their gratification. It also inquires how different kinds of economic legislation by the state tend to affect its own resources, and the productiveness of the labors of its people.

The substance of this definition of pure economics will be found, in germ, in a number of treatises, and, by implication at least, in nearly all. Thus Jevons: "The great problem of Economy may, it seems to me, be stated thus: *Given, a certain population, with various needs and powers of production, in possession of certain lands and other sources of material: required, the mode of employing their labor so as to maximize the utility of their produce.*"

This idea of political economy is central in a twofold way: (1) As the desire of man to gain the maximum of utilities with the minimum of effort, subject to the limitations indicated, is the final cause or ultimate end of the science, whether as affecting man individually, socially, or politically; and (2) as in ascertaining truths, laws, or tendencies which may guide men in

realizing this desire, or states in legislation to promote it, the prime facts to be understood and considered are—How will men on the whole act under given circumstances? How do they act in present circumstances? How will they act on the supposition that these circumstances are altered by legislation or otherwise? Thus, with the present habits of our people, we know that for all sums greater than fractions of a dollar they prefer, for various reasons, for ordinary use, a perfectly convertible paper currency, to the metallic dollars into which they are convertible. But should government order the issue of a large quantity of irredeemable paper dollars, whether legal tender or not, the people would prefer to *take* metallic dollars in place of them, and *to pay out*, for the discharge of their debts, these in preference to gold and silver; because the latter having a higher purchasing and debt-paying power, in *international* trade with foreign countries, they would inevitably soon come to be at a premium here over inconvertible paper. All this more than fifteen years' experience (since 1862) in this country has abundantly illustrated. During this period, next to no gold and silver was in circulation, because it was more valuable in the bullion market. All legislators may know that heavy taxes on property, or titles to property, easily concealed will be largely evaded, throwing unequal burdens on honesty and offering a premium to dishonesty.

The foregoing definition of political economy, in our judgment, includes whatever of truth, and avoids whatever of error or deficiency characterizes the current definitions.

It certainly includes whatever is true in those definitions which make it the science of wealth. Wealth is the sum-total of commodities, or of material objects having a utility impressed upon them by human labor, in virtue of which they have a value either in use or exchange. Now the whole scope of political economy, as respects wealth, is to ascertain according to what laws the maximum of such commodities can be produced with the minimum of labor, and in conformity to the laws of our rational, moral, and physical constitution. In other words, it is the science which sets forth the laws according to which our wants are supplied in the largest measure with the least waste of human effort and sacrifice. But, besides being the science of utilities produced by human labor, and embodied in commodi-

ties more or less enduring, it is the science of utilities produced by human labor or services terminating in modifications of material objects however tenuous, transient, or perishable. The labor of the body-servant or nurse even when they simply produce a momentary modification in the condition of the employer's body, and thence of his mind; of the musician or orator who produces those momentary vibrations of the air we call sound, through these reaching the minds and gratifying the desires of others; of the acrobat who so affects his own body, his implements, fixtures, animals, the surrounding air, as to reach the vision and delight the mind of the spectator; the various services of professional men, come within the scope of this definition, and equally whether obtained by exchange and purchase or not. It is utilities, whether transient or enduring, imparted to material substances by human labor, all and singular of these, and these alone, that constitute the subject-matter of Political Economy. And the problem is, how to get the most of them, in due subordination to every element, interest, and law of our nature which they ought to subserve, with the least expenditure of labor and sacrifice. This is economy in individuals, families, societies, and when applied to states or masses of people politically organized, it is Political Economy.

This definition covers whatever of truth, and excludes whatever of error, is involved in defining it as the science of exchange, or exchangeable values. Certainly it includes all these, and they occupy directly or indirectly the larger part of its domain, because exchange is so largely the instrument by which the increased efficiency of division of labor in production can be availed of. But as we have seen, a given amount of human labor often compasses the maximum of utilities without resort to this agency. The difficulties into which this definition of the science drives such eminent writers as Professor Perry and Mr. McLeod have been in part well pointed out by Professor Price, but only in part. One of the consequences is the definition of labor as "any human exertion that demands something for itself in exchange. . . . Nothing is labor that does not look to a sale. Labor, like everything else in political economy, is tested by the criterion of a sale." ("Introduction to Political Economy," pp. 94, 95.) If then a farmer plants, tills, gathers,

husks corn for his own consumption, and that of his animals which he uses but does not sell, this is not labor. But if he does it for the purpose of selling these products of his hand, it is labor! Surely theories and definitions leading logically to such consequences must be defective. Again, "Value has no existence in connection with one thing or one person." And is the pet horse which a man has reared with toil and care for his own use exclusively, and with no thought of sale, perhaps when he is so far from market as not to be salable, without value? Again: "*Value is not a quality of any one thing, but a relation subsisting between two things.* It is, as the definition gives it, *a relation of mutual purchase.*" We humbly submit, as we have said before, that "the relation of mutual purchase" has been shown to be not the essence but one of the accidents of value; that this, too, is some "quality of a thing," held in such estimation or so desired by some person or persons that, they are ready to work, or to give what has cost work, to obtain it. And the amount of service, or products of service which they are willing to apply to its procurement, is the measure of its value.

Another anomaly born of this narrow definition of political economy, as solely the science of exchange, is that no human effort or its result is entitled to be regarded as Production, unless designed for sale or exchange. This is argued even from the etymology of the word by Mr. McLeod in his "Economic Philosophy," also by Prof. Perry, who says: "The term Production is derived from the Latin word *producere*, which means *to lead forth, to expose for sale.* Terence uses the expression *producere servos*, to offer slaves for sale. . . . In common language, the growth of the farm is called *produce*, but only when it is offered for sale, in which sense we speak of the *produce market.* The fundamental meaning of the root-word both in Latin and English is *effort with reference to a sale;* and this is the exact scientific sense in which I propose to use the word and its derivatives. I hope I am making at this point a slight contribution to a more exact nomenclature of political economy." (Introd. to Pol. Econ., pp. 70, 71.)

We should be glad to share this hope, but will soon show why we cannot, especially in the light of the illustration he proceeds to give thus: "Production is always effort, but it is not

every kind of effort that is production. My boy is now playing the piano in the parlor; it is effort for him,—irksome effort,—but as he has no intention to sell his acquired skill upon that instrument, it cannot be called *productive* effort. It is effort put forth for altogether other than commercial reasons. The effort of his music-teacher, however, who comes here to give him his lessons is productive effort, inasmuch as it is put forth solely with reference to a sale." (pp. 70, 71.)

Are not such distinctions too artificial and arbitrary to stand? Would it be any the less production if the music-teacher should give his services, which develop this musical skill, gratuitously, out of friendship or pure benevolence? Suppose that the musical skill so acquired, tho first *intended* only for the unpaid gratification of the learner and others, should, as often happens, come to be used in teaching or entertaining others for pay, is it any more or less a product because he had no such intention in acquiring it? Are not sheep, raised exclusively with the design of being prepared and consumed for food and raiment in the family of their owner, produce? Nor is the etymological argument much stronger. We are sure that, while the generic meaning of *producere* is to lead forth, that of leading forth for sale is only one of manifold specific applications or modifications of it "in Latin and English." It just as much means to produce for use as for sale; and it means to produce in the sense of bringing new utilities into being by human labor with either intent. Any Latin lexicon will show that bringing forward for sale is only one of several meanings of *produco;* while Webster does not in any instance thus define the English corresponding verb, adjective, or noun. He defines to produce as meaning "to bring forward; to bring forth; to bear; as plants on the soil; to cause, to effect; to bring into existence; to raise; to bring into being; the farmer *produces* grain enough for his family; . . . the manufacturer produces excellent wares," etc. etc. In a word, it signifies not so much to bring to market as to bring to view or into being, and this whether for use or for sale. A farmer producing grain for his family surely is not producing it for sale.

Another erroneous consequence of the dogma that political economy is the science of exchange, including all exchangeable things and no other, is the corollary that incorporeal rights,

hereditaments—mere paper evidences of the title to property or ownership of wealth, or means of commanding the use of capital—are themselves property, wealth, or capital. They will exchange for money or valuable things, and therefore are wealth or capital. This error has been well pointed out by Prof. Price. Mr. McLeod places incorporeal rights in this category. Prof. Perry tells us that "credit in all its forms is *an addition* to the mass of other exchangeable property. . . . This secured property is a claim on the buyer of the goods for some form of property to be rendered by him in the future." According to this, when one sells to another a house, and takes a mortgage for it, there is an immediate doubling of the property. The house still exists. The mortgage has been created in addition, which also is property. But is it not undeniable that the only real property in the case is the house? The mortgage is simply evidence of the extent of the mortgagee's continued ownership in it, until the mortgage is paid in money or other commodities. If credits are a real addition to property, instead of being the mere means of its conveyance from the lender to the borrower, then a simple way of duplicating the property of a country would be to sell it all on credit. Nay, these credits or titles to property might themselves be loaned, as often happens. Thus property might be trebled and quadrupled, and so on—paper credit strung upon paper credit, according to the most progressive financial kiting, *ad infinitum*.

Much to the same purport is the doctrine laid down in regard to bank deposits, and the loan of them to borrowers. "The gain for the whole community from such operations in credit is that a *new capital* has thus been created, a new purchasing power, something in the world of value additional to what existed before" (p. 284). No new capital is made by simply placing money, or loanable funds, or the title to them, in a bank which loans such resources to its borrowers. This creates no new "capital," but simply facilitates the distribution of existing capital to the parties able to use it profitably, and to pay a suitable reward in the form of interest for it. "Purchasing power" in the form of credit is not capital, altho it helps procure the loan of capital. It may thus facilitate its passing into the hands of those who will use it most profitably, and so make it an instrument in

the production of wealth, by promoting profitable exchange or otherwise. Credit as a "purchasing power," if unduly inflated, contributes to the destruction of wealth and capital by tempting to unwarranted extravagance of living, and to enterprises which consume, but do not replace, or remunerate, capital.

As to shares, bonds, or other credits in public securities, national, state, or municipal, in railway, mining, manufacturing, or other companies, they are simply the rights of the owners, in the former class of cases, to a certain amount of the wealth of the political communities which owe them, and are payable from that part of the products of the community which are obtained by taxation; in the latter class of cases, to a certain share of, or lien upon, the property, with its income, of the respective companies concerned. They are incorporeal property in a legal, but not in an economic sense. They are evidences of a right to material commodities. The same is true of such typical instances cited of intangible values, as the good-will of a store—which is simply the disposition of the customers it has acquired under skilful and upright management, to continue to trade or make exchanges with it on terms which will better remunerate the labor and capital it employs than would otherwise be possible. Buying this is merely buying the equivalent of another motor to increase the productiveness of labor and capital.

The definition of the science of political economy we have offered includes that which makes it the science of the phenomena of wealth, in the production of utilities embodied in material objects, *so far as these are in any manner due to the agency of the human will.* All the phenomena with which it has to do certainly fall under this category; for they are the result of Labor. And Labor is the effort of man directed by his reason and will to the production of utilities. With utilities otherwise produced it has no concern except as related to them. The relation of economics to other utilities and to other sciences, physical and mental, is that they furnish light to the reason for the guidance of the will in most easily producing those effects on material objects which will satisfy desire. But its own sphere is distinct from those sciences except where they are conterminous with it, and, as happens in other sciences thus reciprocally related, so far seem to interpenetrate, that it is not

always easy to detect a breadthless line which absolutely divides them. It is quite commonly thought and said, economics involves the knowledge of those physical sciences, pure and applied, which shed light upon methods of easiest production. This is impossible, and would involve the impracticable feat for the economist of becoming an encyclopedist in science. Instead of this it takes, and supposes that men in the pursuit of wealth will, so far as they have normal intelligence, tend to accept and utilize, whatever other sciences, pure and applied, have discovered or invented which may so aid or direct labor as to render it more effective. The economist, *as such*, is not an expert in regard to mechanics, chemistry, optics, acoustics, heat, electricity, magnetism, metallurgy, mining, biology, physiology, medicine, hygiene, meteorology, soils, climates, drainage, steam-engines, telegraphs, machines, and the like. He takes, and he assumes that, in the absence of counteracting forces or influences, men will utilize, whatever is established and made ready to their hand on these subjects by experts and authorities in the several departments outside of this. Economics touches, without including them, only at those points where they afford light to guide the effort of man in the most efficient production of material utilities. But in the same way ethical science, in its applications to concrete human action, at all events to men in judging how to act rightly, may receive light from all such sciences, including economics. Meteorology may give us weather probabilities every day, hygiene may reveal conditions of health, which ethically we ought not to disregard, without their being a part of the science of ethics.

As economic science has to do with material utilities only as these result from the effort of man striving to gratify his desires under the direction of his will and reason, so its determining principles and laws are found in the actings of the human soul in the premises. All else in material objects, apprehended by the intellect, and sought by efforts prompted by the desires and will, is manifested by the sciences specially concerned with showing their properties and laws. Hence, if we inquire whether it properly classes with the mental or physical sciences, it chiefly finds its place among the former. It is natural and common to class it with the sciences of matter, because it has to do with the

production of material utilities. But a moment's attention shows that it has to do with these only as far as they are the products of effort directed by the reason and will to the gratification of desires—all mental. Prof. Cairnes regards it as "belonging neither to the department of physical nor to that of mental inquiry," but as having for its subject-matter the complex phenomena presented by the concurrence of physical, physiological, and mental laws." This view is ably supported by him. But we see nothing in his argument to rebut the reasons we have given, or which would not bear equally against ethics ranking as a mental science. In determining what is morally right in dealings between man and man, does not much depend upon a knowledge of physical and physiological laws, facts, and conditions? How otherwise can duty be done in the nurture and education of children, or in rendering unto servants that which is just and equal, or providing things honest in the sight of all men? In both economics and ethics, however, it is more in the application of their respective principles, than the pure principles themselves, that they thus become complicated with any inquiries of physical science. Pure economics is the science of tendencies towards certain results, whose accomplishment depends upon the presence or absence of concurrent or contrary tendencies. But as a science whose phenomena are determined by the will in conjunction with other mental faculties, it classes with the mental sciences as truly as ethics, whose phenomena are similarly determined.

It is in place here to say a word more in respect to the relation of this science to ethics, with which it classes as dealing with phenomena determined by the intellect, desires, and will of man. Yet its province is not primarily ethical, or the ascertainment of ethical laws, any more than it is mathematics or ontology. But it assumes that man ought to be governed by ethical and religious truths. These the actions of rational and accountable beings can never violate without a loss and wrong which no gains of material or other advantage can compensate. Its function is not to teach moral science, nor to release men from its behests; not to give a philosophical analysis of conscience, nor to annul its categorical imperatives; not to impair the authority and practical standards of Scripture, but rather

to show men how they may most effectually carry out its requirements in respect to what must be the constant task of the great mass of mankind; how they may put their talents to the most productive use, so as not to be unprofitable servants; owe no man anything, render to all their dues; provide for their own; have wherewith to give liberally for charity and religion. The constant injunction of the Bible is to diligence and against sloth, insomuch that "if any man would not work, neither should he eat." Economics aims to help him make these labors more productive and less abortive; and to aid statesmen in ascertaining what legislation will tend to promote or hinder this result of the labors of the community at large. It aims simply to prevent the needless waste, and promote the richest fruits of human toil. Whether the desires that stimulate such toils and the methods of conducting them are or are not in violation of morality and religion, it submits wholly to the disposal of morality and religion. Whoever fails to "do justice, love mercy, and walk humbly with his God," in his efforts to get subsistence, enjoyment, or wealth, with the least toil and sacrifice, does so at his peril. There has been a great confusion of ideas on this subject, fostered by a want of due discrimination, not only in the popular mind, but by some leading economic writers. It is supposed that the science is quite regardless of humanity, morals, and religion, because it does not directly treat of these any further than they have to do with the efficiency and productiveness of human labor. The same objection might be brought against the science of electricity, engineering, or even mathematics and common arithmetic. They do not deal directly with ethics. Those engaged in them in furtherance of the good purposes they are capable of serving, and in conformity to ethical laws, use them for good, altho they may be perverted to other ends. Arithmetic ought to be employed in such a way as to promote honesty in exchanges, by right weights and measures. But while it may and should be used to assist, it does not teach morality. It is frequently abused by dishonest fiduciary agents to hide embezzlements and protect dishonesty. The steam-engine, printing-press and post-office may be employed for the circulation of a pure and wholesome literature, or of foul and obscene sheets and pictures. But none the less do

all who aim to do good in the use of these mighty agencies desire to have them so contrived and constructed as to produce, with a minimum of effort, the maximum of good results. Our missionary and charitable societies rightly use steam and all available appliances to accomplish the largest possible good with the resources at their command. The steamship and its engineer concur with the economist in promoting this result, altho *per se* they are not in the sphere of ethics and religion, but furnish means of energizing human labor in a way that may be used for the best, or abused for the worst purposes. The same ship that takes the missionary to Christianize the heathen, may take the "liquid fire and distilled damnation" that shall diabolize and ruin them.

But while economics is not ethics, tho it always assumes that its ends are to be prosecuted in conformity to ethical and all other known truth, it must not be forgotten that sound morality is always and everywhere productive of the highest economic thrift. If we look no further than simple fidelity and superiority to eye-service in the laborer, in ways innumerable such labor is vastly more productive than that of shirking and shiftless men. The Christian virtue of prudence in providing against the time to come, prevents waste and promotes savings and the accumulation of capital. Credit, which, tho not capital, is, if not abused, the mightiest instrument for placing existing capital in the hands that will most effectively use it, has its roots in strict industrial and mercantile uprightness, which most thrives in an atmosphere of pure morality and religion. The collapse of credit is always the collapse of trade and manufactures. Further still: the true spirit of religion and philanthropy will tend more than all else to ease the friction between employers and employés, mistakenly called the conflict of labor and capital, by producing a feeling of mutual interest and dependence, so that neither can say to the other, "I have no need of thee;" that both may feel the prosperity of each to be the prosperity of all; and that for these parties to conspire against each other, is as if the body should set itself against its members, or these set themselves in turn against the stomach. A war of labor against capital is a war against the unspent fruits of past labor saved to aid and support present labor.

Some writers, of whom Professors Newcomb and Stanley Jevons are examples, maintain that economics can yet be placed upon a mathematical basis; that the desires which give rise to all economical phenomena are reducible to the desire to obtain pleasure and avoid pain; that this can ultimately be put in quantitative relations and proportions capable of mathematical expression, like some of the physical forces; that thus a few facts of observation or inductive generalization, being set in mathematical formulæ, will constitute a basis or calculus for innumerable deductions, as in astronomical science eclipses and other phenomena are calculated with unfailing accuracy for centuries. Prof. Jevons applies this view, of course, to ethics, which, according to the Hedonistic system of Bentham and Paley adopted by him, must stand upon the same footing. We have seen no evidence, however, that human desires can be mathematically measured. Unquestionably when we pass from the domain of pure economic science to its practical applications, from tendencies to facts, however complex their nature or origin, figures as well as facts enter largely in. We cannot take the first step in using money, or making it the measure of value in accounts, without arithmetical figures and computations. But this is very different from ascertaining and expressing ethical and economic *laws* mathematically, or by mathematics as a calculus. It is one thing to find the economic law that prices oscillate with the ratio of supply to demand, or that a baser currency will drive out of circulation a more precious one having only the same debt-paying power; another to collect statistics expressed in numbers, which may illustrate this law and other influences always concurrent with and qualifying its influence. We agree with Prof. Cairnes "that, having regard to the sources from which political economy derives its premises, the science does not admit of mathematical treatment."

But altho not a mathematical, it is characteristically more an *a priori*, than an *a posteriori* science. It could hardly be otherwise when it constrains so distinguished an empiricist as J. S. Mill to declare it so. He says (see "Unsettled Questions in Political Economy," p. 146): "We go further than to affirm that the method *a priori* is a legitimate mode of philosophical investigation in the moral sciences; we contend that it

is the only mode. We affirm that the method *a posteriori* or that of specific experience is altogether inefficacious in these sciences as a means of ariving at any considerable body of valuable truth, tho it admits of being usefully applied in aid of the method *a priori*, and even forms an indispensable supplement to it." It is not *a priori* in the high Kantian sense of obtaining its premises and the sources of its premises without experiential proof—as is the case in pure mathematics and logic. Its premises are found in what we know, from experience, to be the longings, views, and volitions of human nature in regard to material utilities, and the easiest method of gaining them. But these being given, we can reason from them to their average actings in given circumstances, and from these actings to certain great economic laws, and from these again to the tendency of given legislation to further or hinder the productiveness of a given amount and kind of human labor. We may know beforehand, from the workings of human nature as such, that, *ceteris paribus*, a depreciated currency, increased taxes, the enormous demands of a great war, failure of crops, will highten prices, and thus augment the profits of those already having goods to sell purchased at former prices, at the expense of all who buy them for consumption. This *a priori* deduction, too, may be illustrated and confirmed by the facts ascertained *a posteriori*. But suppose we had nothing besides the fact of the immense rise of prices during the late war, what economic truth would that establish, unless we knew not only *a posteriori* the facts which preceded it, already enumerated, but *a priori* the causative tendencies of these several groups of facts? In addition to the factors above specified others might be named, affecting not only prices but general prosperity as well—such as the general moderate depreciation of gold itself in other countries, the discovery and development of the petroleum trade, the vast extension of railway enterprise, etc. etc. Says Mr. Cairnes: "In presence of influences so numerous, so novel, and so vast, each affecting industry in its own fashion so powerfully, who shall say what portion of what we now find existing can be attributed to any one of them? The problem, in its mere statement, brings into striking relief the utter futility of that so-called 'inductive method' which some writers hold to be the

proper one in social and economic inquiries—the method, that is to say, which would proceed by drawing general conclusions as to the operation of particular causes from the summarized results of statistical tables." (See his "Political Economy," p. 389.)

The fallacy of *post hoc ergo propter hoc* is among the most common, specious, and shallow of all. But nowhere has it had a more disastrous prevalence than in popular economics. We once heard a juvenile orator captivate some of the magnates of the land by arguing that the imposition of a certain grade of impost taxes by Congress had been followed by seasons of industrial activity and prosperity. The same is true of the conflagrations in great cities destroying property by tens and hundreds of millions. The building trades immediately flourish in consequence of such enormous impoverishment of communities. But the commercial crash of 1873 was precipitated by these, as well as by unproductive outlays in railways, speculation, overdone manufacturing and trade, and extravagant living. One of the most opulent men of the country, whose riches were the fruit of his own energy and sagacity, said to us in the most destructive crisis of our civil war, "This war is creating immense wealth!" So it did for a few at the cost of the many—not increase of absolute wealth indeed, but, while destroying it, transferring much of the remainder to contractors, speculators, and the fortunate owners of and dealers in certain kinds of property. Fortunes were made out of the fluctuations in the gold premium so costly to the country. A common talk among sympathizers with the great railroad strike and riots of 1877 was that the destruction of railroad property would be a good thing because it would make a better demand and higher prices for labor to replace it! It has been well observed that when prices of given articles are high, they are scarce; when low, they are plenty. The mere statistical or inductive method, which does not look to *a priori* causative influences, would thence argue that the way to stimulate plentiful production is to depress prices: whereas it is not low and unremunerative prices of articles, but the contrary, that stimulates production. If, indeed, the reduced price is still within remunerative limits; and, by increasing consumption, in this way increases production, or by cheapening production

when this is enlarged to meet the proportionally increased demand, then, up to a certain point, demand and supply may be mutually intensified by lowering prices. But all this is learned not by mere statistics, but by rightly estimating the causative influences in the antecedent facts and resulting motives to human action, which give rise to and explain these phenomena.

LYMAN H. ATWATER.

HAECKEL ON THE EVOLUTION OF MAN.

ERNST HAECKEL is an eminent comparative anatomist and physiologist, who has earned a wide and deserved reputation by his able and laborious studies of the Calcareous Sponges, the Radiolarians and other low forms of life. In his work on "The Evolution of Man" he applies this knowledge to the solution of the problem of the origin of humanity, and sets himself not only to illustrate but to "prove" the descent of our species from the simplest animal types, and even to overwhelm with scorn every other explanation of the appearance of man, except that of spontaneous evolution. The book is full of important facts, well stated. The great reputation of the author is likely to give it a wide currency, and there can be little doubt that it will exercise an important influence, more especially upon young men of the educated classes. It merits therefore a careful examination, both as to its data and the manner of treatment of the subject. To understand the latter, it will be necessary in the first place to glance at Haeckel's personal position with reference to the study of Nature.

He is not merely an evolutionist but what he terms a "monist," and the monistic philosophy, as defined by him, includes certain negations and certain positive principles of a most comprehensive and important character. It implies the denial of all spiritual or immaterial existence. Man is to the monist merely a physiological machine, and nature is only a greater self-existing and spontaneously-moving aggregate of forces. Monism can thus altogether dispense with a Creative Will, as originating nature, and adopts the other alternative of self-existence or causelessness for the universe and all its phenomena. Again, the monistic doctrine necessarily implies that man, the animal, the

plant, and the mineral are only successive stages of the evolution of the same primordial matter, constituting thus a connected chain of being, all the parts of which sprang spontaneously from each other. Lastly, as the admixture of primitive matter and force would itself be a sort of dualism, Haeckel regards these as ultimately one, and apparently resolves the origin of the universe into the operation of a self-existing energy having in itself the potency of all things. After all, this may be said to be an approximation to the idea of a Creator, but not a living and willing Creator. Monism is thus not identical with pantheism, but is rather a sort of atheistic monotheism, if such a thing is imaginable, and vindicates the assertion attributed to a late lamented physical philosopher that he had found no atheistic philosophy which had not a God somewhere.

Haeckel's own statement of this aspect of his philosophy is somewhat interesting. He says: "The opponents of the doctrine of evolution are very fond of branding the monistic philosophy grounded upon it as 'materialism,' by comparing *philosophical* materialism with the wholly different and censurable *moral* materialism. Strictly, however, our 'monism' might as accurately or as inaccurately be called spiritualism as materialism. The real materialistic philosophy asserts that the phenomena of vital motion, like all other phenomena of motion, are effects or products of matter. The other opposite extreme, spiritualistic philosophy, asserts on the contrary that matter is the product of motive force, and that all material forms are produced by free forces entirely independent of the matter itself. Thus, according to the materialistic conception of the universe, matter precedes motion or active force; according to the spiritualistic conception of the universe, on the contrary, active force or motion precedes matter. Both views are dualistic, and we hold them both to be equally false. A contrast to both is presented in the *monistic* philosophy, which can as little believe in force without matter as in matter without force."

It is evident that if Haeckel limits himself and his opponents to matter and force as the sole possible explanations of the universe, he may truly say that matter is inconceivable without force and force inconceivable without matter. But the question arises, What is the monistic power beyond these, the "Power

behind Nature"? and as to the true nature of this the Jena philosopher gives us only vague generalities, tho it is quite plain that he cannot admit a spiritual creator. Further, as to the absence of any spiritual element from the nature of man, he does not leave us in doubt as to what he means; for, immediately after the above paragraph, he informs us that "the 'spirit' and 'mind' of man are but forces which are inseparably connected with the material substance of our bodies. Just as the motive power of our flesh is involved in the muscular form-element, so is the thinking force of our spirit involved in the form-element of the brain." In a note appended to the passage, he says that monism "conceives nature as one whole, and nowhere recognizes any but mechanical causes." These assumptions as to man and nature pervade the whole book, and of course greatly simplify the task of the writer, as he does not require to account for the primary origin of nature, or for anything in man except his physical frame, and even this he can regard as a thing altogether mechanical.

It is plain that we might here enter our dissent from Haeckel's method, for he requires us to assume many things which he cannot prove, before we can proceed a single step in the evolution of man. What evidence is there, for example, of the possibility of the development of the rational and moral nature of man from the intelligence and instinct of the lower animals, or of the necessary dependence of the phenomena of mind on the structure of brain-cells? The evidence, as far as it goes, seems to tend the other way. What proof is there of the spontaneous evolution of living forms from inorganic matter? Experiment so far negatives the possibility of this. Even if we give Haeckel, to begin with, a single living cell or granule of protoplasm, we know that this protoplasm must have been produced by the agency of a living vegetable cell previously existing, and we have no proof that it can be produced in any other way Again, what particle of evidence have we that the atoms or the energy of an incandescent fire-mist have in them anything of the power or potency of life. We must grant the monist all these postulates as pure matters of faith before he can begin his demonstration; and as none of them are axiomatic truths, it is evident that so far he is simply a believer in the dogmas of a

philosophic creed, and weak as other men whom he affects to despise.

We may here place over against his authority that of another eminent physiologist of more philosophic mind, Dr. Carpenter, who has recently said: "As a physiologist I must fully recognize the fact that the physical force exerted by the body of man is not generated *de novo* by his will, but is derived directly from the oxidation of the constituents of his food. But holding it as equally certain, because the fact is capable of verification by every one as often as he chooses to make the experiment, that in the performance of every volitional movement physical force is put in action, directed, and controlled by the individual personality or *ego*, I deem it as absurd and illogical to affirm that there is no place for a God in nature, originating, directing, and controlling its forces by his will, as it would be to assert that there is no place in man's body for his conscious mind."

Taking Haeckel on his own ground, as above defined, we may next inquire as to the method which he employs in working out his argument. This may be referred to three leading modes of treatment, which, as they are somewhat diverse from those ordinarily familiar to logicians, and are extensively used by evolutionists, deserve some illustration, more especially as Haeckel is a master in their use.

An eminent French professor of the art of slight-of-hand has defined the leading principle of jugglers to be that of "appearing and disappearing things," and this is the best definition that occurs to me of one method of reasoning largely used by Haeckel, and of which we need to be on our guard when we find him employing, as he does in almost every page, such phrases as "it cannot be doubted," "we may therefore assume," "we may readily suppose," "this afterwards assumes or becomes," "we may confidently assert," "this developed directly," and the like, which in his usage are equivalent to the *presto* of the conjurer, and which, while we are looking at one structure or animal, enable him to persuade us that it has been suddenly transformed into something else.

In tracing the genealogy of man he constantly employs this kind of slight-of-hand in the most adroit manner. He is per-

haps describing to us the embryo of a fish or an amphibian, and as we become interested in the curious details, it is suddenly by some clever phrase transformed into a reptile or a bird; and yet without rubbing our eyes and reflecting on the differences and difficulties which he neglects to state, we can scarcely doubt that it is the same animal after all.

The little lancelet, or *Amphioxus*, of the European seas, a creature which was at one time thought to be a sea-snail, but is really more akin to fishes, forms his link of connection between our "fish ancestors" and the invertebrate animals. So important is it in this respect that our author waxes eloquent in exhorting us to regard it "with special veneration" as representing our "earliest Silurian vertebrate ancestors," as being of "our own flesh and blood," and as better worthy of being an object of "devoutest reverence" than the "worthless rabble of so-called 'saints.'" In describing this animal he takes pains to inform us that it is more different from an ordinary fish than a fish is from a man. Yet as he illustrates its curious and unique structure, before we are aware the lancelet is gone and a fish is in its place, and this fish with the potency to become a man in due time. Thus a creature intermediate in some respects between fishes and mollusks, or between fishes and worms, but so far apart from either that it seems but to mark the width of the gap between them, becomes an easy stepping-stone from one to the other.

In like manner the ascidians, or sea-squirts, mollusks of low grade, or, as Haeckel prefers to regard them, allied to worms, are most remote in almost every respect from the vertebrates. But in the young state of some of these creatures, and in the adult condition of one animal referred to this group (*Appendicularia*), they have a sort of swimming tail, which is stiffened by a rod of cartilage to enable it to perform its function, and which for a time gives them a certain resemblance to the lancelet or to embryo fishes; and this usually temporary contrivance, curious as an imitative adaptation but of no other significance, becomes, by the art of "appearing and disappearing," a rudimentary backbone, and enables us at once to recognize in the young ascidian an embryo man.

A second method characteristic of the book, and furnishing

indeed the main basis of its argument, is that of considering analogous processes as identical, without regard to the difference of the conditions under which they may be carried on. The great leading use of this argument is in inducing us to regard the development of the individual animal as the precise equivalent of the series of changes by which the species was developed in the course of geological time. These two kinds of development are distinguished by appropriate names. *Ontogenesis* is the embryonic development of the individual animal, and is of course a short process, depending on the production of a germ by a parent animal or parent pair, and the further growth of this germ in connection more or less with the parent or with provision made by it. This is of course a fact open to observation and study, tho some of its processes are mysterious and yet involved in doubt and uncertainty. *Phylogenesis* is the supposed development of a species in the course of geological time, and by the intervention of long series of species, each in its time distinct, and composed of individuals each going regularly through a genetic circle of its own.

The latter is a process not open to observation within the time at our command; purely hypothetical, therefore, and of which the possibility remains to be proved, while the causes on which it must depend are necessarily altogether different from those at work in ontogenesis, and the conditions of a long series of different kinds of animals, each perfect in its kind, are equally dissimilar from those of an animal passing through the regular stages from infancy to maturity. The similarity in some important respects of ontogenesis to phylogenesis was inevitable, provided that animals were to be of different grades of complexity, since the development of the individual must necessarily be from a more simple to a more complex condition. On any hypothesis, the parallelism between embryological facts and the history of animals in geological time affords many interesting and important coincidences. Yet it is perfectly obvious that the causes and conditions of these two successions cannot have been the same. Further, when we consider that the embryo cell which develops into one animal must necessarily be originally distinct in its properties from that which de-

velops into another kind of animal, even tho no obvious difference appears to us, we have no ground for supposing that the early stages of all animals are alike; and when we rigorously compare the development of any animal whatever with the successive appearance of animals of the same or similar groups in geological time, we find many things which do not correspond, not merely in the want of links which we might expect to find, but in the more significant appearance, prematurely or inopportunely, of forms which we would not anticipate. Yet the main argument of Haeckel's book is the quiet assumption that anything found to occur in ontogenetic development must also have occurred in phylogenesis, while manifest difficulties are got rid of by assuming atavisms and abnormalities.

A third characteristic of the method of the book is the use of certain terms in peculiar senses, and as implying certain causes which are taken for granted, tho their efficacy and mode of operation are unknown. The chief of the terms so employed are "heredity" and "adaptation." Heredity is usually understood as expressing the power of permanent transmission of characters from parents to offspring, and in this aspect it expresses the constancy of specific forms. But as used by Haeckel it means the transmission by a parent of any exceptional characters which the individual may have accidentally assumed. Adaptation has usually been supposed to mean the fitting of animals for their place in nature, however that came about. As used by Haeckel it imports the power of the individual animal to adapt itself to changed conditions and to transmit these changes to its offspring. Thus in this philosophy the rule is made the exception and the exception the rule, by a skilful use of familiar terms in new senses; and heredity and adaptation are constantly paraded as if they were two potent divinities employed in constantly changing and improving the face of nature.

It is scarcely too much to say that the conclusions of the book are reached almost solely by the application of the above-mentioned peculiar modes of reasoning to the vast store of facts at command of the author, and that the reader who would test these conclusions by the ordinary methods of judgment must be constantly on his guard. Still it is not necessary to believe that Haeckel is an intentional deceiver. Such fallacies are those

which are especially fitted to mislead enthusiastic specialists, to be identified by them with proved results of science, and to be held in an intolerant and dogmatic spirit.

Having thus noticed Haeckel's assumptions and his methods, we may next shortly consider the manner in which he proceeds to work out the phylogeny of man. Here he pursues a purely physiological method, only occasionally and slightly referring to geological facts. He takes as a first principle the law long ago formulated by Hunter, *Omne vivum ex ovo*—a law which modern research has amply confirmed, showing that every animal, however complex, can be traced back to an egg, which in its simplest state is no more than a single cell; tho this cell requires to be fertilized by the addition of the contents of another dissimilar cell, produced either in another organ of the same individual or in a distinct individual. This process of fertilization Haeckel seems to regard as unnecessary in the lowest forms of life; but tho there are some simple animals in which it has not been recognized, analogy would lead us to believe that in some form it is necessary in all. Haeckel's monistic view, however, requires that in the lowest forms it should be absent, and should have originated spontaneously, tho how does not seem to be very clear, as the explanation given of it (vol. ii. p. 391 *et seq.*) amounts to little more than the statement that it must have occurred. Still as a "dualistic" process it is very significant with reference to the monistic theory.

Much space is of course devoted to the tracing of the special development or ontogenesis of man, and to the illustration of the fact that in the earlier stages of this development the human embryo is scarcely distinguishable from that of lower animals. We may indeed affirm that all animals start from cells which in so far as we can see are similar to each other, yet which must include potentially the various properties of the animals which spring from them. As we trace them onward in their development, we see these differences manifesting themselves. At first all pass, according to Haeckel, through a stage which he calls the "gastrula," in which the whole body is represented by a sort of sac, the cavity of which is the stomach and the walls consist of two layers of cells. It should be stated, however, that many eminent naturalists dissent from this view, and maintain that

even in the earliest stages material differences can be observed. In this they are probably right, as even Haeckel has to admit some degree of divergence from this all-embracing "gastræa" theory. Admitting, however, that such early similarity exists within certain limits, we find as the embryo advances that it speedily begins to indicate whether it is to be a coral animal, a snail, a worm, or a fish. Consequently the physiologist who wishes to trace the resemblances leading to mammals and to man has to lop off, one by one, the several branches which lead in other directions, and to follow that which conducts by the most direct course to the type which he has in view. In this way Haeckel can show that the embryo *Homo sapiens* is in successive stages so like to the young of the fish, the reptile, the bird, and the ordinary quadruped, that he can produce for comparison figures in which the cursory observer can detect scarcely any difference.

All this has long been known, and has been regarded as a wonderful evidence of the homology or unity of plan which pervades nature, and as constituting man the archetype of the animal kingdom—the highest realization of a plan previously sketched by the Creator in many ruder and humbler forms. It also teaches that it is not so much in the mere bodily organism that we are to look for the distinguishing characters of humanity as in the higher rational and moral nature.

But Haeckel, like other evolutionists of the monistic and agnostic schools, goes far beyond this. The ontogeny, on the evidence of analogy as already explained, is nothing less than a miniature representation of the phylogeny. Man must in the long ages of geological time have arisen from a monad, just as the individual man has in his life-history arisen from an embryo cell, and the several stages through which the individual passes must be parallel to those in the history of the race. True, the supposed monad must have been wanting in all the conditions of origin, sexual fertilization, parental influence, and surroundings. There is no perceptible relation of cause and effect any more than between the rotation of a carriage-wheel and that of the earth on its axis. The analogy might prompt to inquiries as to common laws and similarities of operation, but it proves nothing as to causation.

In default of such proof, Haeckel favors us with another analogy derived from the science of language. All the Indo-European languages are believed to be descended from a common ancestral tongue, and this is analogous to the descent of all animals from one primitive species. But unfortunately the languages in question are the expressions of the voice and thought of one and the same species. The individuals using them are known historically to have descended by ordinary generation from a common source, and the connecting links of the various dialects are unbroken. The analogy fails altogether in the case of species succeeding each other in geological time, unless the very thing to be proved is taken for granted in the outset.

The actual proof that a basis exists in nature for the doctrine of evolution founded on these analogies might be three-fold. *First*, there might be changes of the nature of phylogenesis going on under our own observation, and even a very few of these would be sufficient to give some show of probability. Elaborate attempts have been made to show that variations as existing in the more variable and the domesticated species lead in the direction of such changes; but the results have been unsatisfactory, and our author scarcely condescends to notice this line of proof. He evidently regards the time over which human history has extended as too short to admit of this kind of demonstration. *Secondly*, There might be in the existing system of nature such a close connection or continuous chain of species as might at least strengthen the argument from analogy; and undoubtedly there are many groups of closely allied species, or of races confounded with true specific types, which it might be not unreasonable to suppose of common origin. These are, however, scattered widely apart, and the contrary fact of extensive gaps in the series is so frequent that Haeckel is constantly under the necessity of supposing that multitudes of species and even of larger groups have perished, just where it is most important to his conclusion that they should have remained. This is of course unfortunate for the theory, but then as Haeckel often remarks, "we must suppose" that the missing links once existed. But *thirdly*, these gaps which now unhappily exist may be filled up by fossil animals; and if in the successive geological periods

we could trace the actual phylogeny of even a few groups of living creatures, we might have the demonstration desired. But here again the gaps are so frequent and serious that Haeckel scarcely attempts to use this argument further than by giving a short and somewhat imperfect summary of the geological succession in the beginning of his second volume. In this he attempts (in Table XVI.) to give a series of the ancestors of man as developed in geological time, but of twenty-one groups which he arranges in order from the beginning of the Laurentian to the modern period, at least ten are not known at all as fossils, and others do not belong so far as known to the ages to which he assigns them. This necessity of manufacturing facts does not speak well for the testimony of geology to the supposed phylogeny of man.

In point of fact it cannot be disguised that, tho it is possible to pick out some series of animal forms, like the horses and camels referred to by some paleontologists, which simulate a genetic order, the general testimony of paleontology is on the whole adverse to the ordinary theories of evolution, whether applied to the vegetable or to the animal kingdom. This the writer has elsewhere endeavored to show; but he may refer here to the labors of Barrande, perhaps unrivalled in extent and accuracy, which show that in the leading forms of life in the older geological formations the succession is not such as to correspond with any of the received theories of derivation.[1] Even evolutionists, when sufficiently candid, admit their case not proven by geological evidence. Gaudry, one of the best authorities on the Tertiary mammalia, admits the impossibility of suggesting any possible derivation for some of the leading groups, and Saporta, Mivart, and Le Conte fall back on periods of rapid or paroxysmal evolution, scarcely differing from the idea of creation by law, or mediate creation as it has been termed.

Thus the utmost value which can be attached to Haeckel's argument from analogy would be that it suggests a possibility that the processes which we see carried on in the evolution of the individual may, in the laws which regulate them, be con-

[1] Those who wish to understand the real bearings of paleontology on evolution should study Barrande's Memoirs on the Silurian Trilobites, Cephalopods, and Brachiopods.

nected in some way more or less close with those creative processes which on the wider field of geological time have been concerned in the production of the multitudinous forms of animal life. That Haeckel's philosophy goes but a very little way toward any understanding of such relations, and that our present information even within the more limited scope of biological science is too meagre to permit of safe generalization, will appear from the consideration of a few facts taken here and there from the multitude employed in these volumes to illustrate the monistic theory.

When we are told that a moner or an embryo cell is the early stage of all animals alike, we naturally ask, Is it meant that all these cells are really similar, or is it only that they appear similar to us and may actually be as profoundly unlike as the animals which they are destined to produce? To make this question more plain, let us take the case as formally stated: "From the weighty fact that the egg of the human being, like the egg of all other animals, is a simple cell, it may be quite certainly inferred that a one-celled parent form once existed, from which all the many-celled animals, man included, developed."

Now let us suppose that we have under our microscope a one-celled animalcule quite as simple in structure as our supposed ancestor. Along with this we may have on the same slide another cell which is the embryo of a worm, and a third which is the embryo of a man. All these, according to the hypothesis, are similar in appearance, so that we can by no means guess which is destined to continue always an animalcule, or which will become a worm or may develop into a poet or a philosopher. Is it meant that the things are actually alike or only apparently so? If they are really alike, then their destinies must depend on external circumstances. Put either of them into a pond and it will remain a monad. Put either of them into the ovary of a complex animal and it will develop into the likeness of that animal. But such similarity is altogether improbable, and it would destroy the argument of the evolutionist. In this case he would be hopelessly shut up to the conclusion that "hens were before eggs," and Haeckel elsewhere informs us that the exactly opposite view is necessarily that of the monistic

evolutionist. Thus, tho it may often be convenient to speak of these three kinds of cells as if they were perfectly similar, the method of "disappearance" has immediately to be resorted to and they are shown to be in fact quite dissimilar. There is indeed the best ground to suppose that the one-celled animals and embryo-cells referred to have little in common except their general form. We know that the most minute cell must include a sufficient number of molecules of protoplasm to admit of great varieties of possible arrangement, and that these may be connected with most varied possibilities as to the action of forces. Further, the embryo-cell which is produced by a particular kind of animal, and whose development results in the reproduction of a similar animal, must contain potentially the parts and structures which are evolved from it, and fact shows that this may be affirmed of both the embryo and sperm cells where there are two sexes. Therefore it is in the highest degree probable that the eggs of a snail and of a man, tho possibly alike to our coarse methods of investigation, are as dissimilar as the animals that result from them. If so, the "egg may be before the hen;" but it is as difficult to imagine the spontaneous production of the egg which is potentially the hen as of the hen itself. Thus the similarity of the eggs and early embryos of animals of different grades is apparent only; and this fact, which embodies a great and perhaps insoluble mystery, invalidates the whole of Haeckel's reasoning on the alleged resemblances of different kinds of animals in their early stages.

A second difficulty arises from the fact that the simple embryo-cell of any of the higher animals rapidly produces various kinds of specialized cells different in structure and appearance and capable of performing different functions, whereas in the lower forms of life such cells may remain simple or may merely produce several similar cells little or not at all differentiated. This objection, whenever it occurs, Haeckel endeavors to turn by the assertion that a complex animal is merely an aggregate of independent cells, each of which is a sort of individual. He thus tries to break up the integrity of the complex organism and to reduce it to a mere swarm of monads. He compares the cells of an organism to the "individuals of a savage community," who, at first separate and all alike in their

habits and occupations, at length organize themselves into a community and assume different avocations. Single cells, he says, at first were alike, and each performed the same simple offices of all the others. "At a later period isolated cells gathered into communities, groups of simple cells which had arisen from the continued division of a single cell remained together and now began gradually to perform different offices of life."

But this is a mere vague analogy. It does not represent anything actually occurring in nature, except in the case of an embryo produced by some animal which already shows all the tissues which its embryo is destined to reproduce. Thus it establishes no probability of the evolution of complex tissues from simple cells, and leaves altogether unexplained that wonderful process by which the embryo-cell not only divides into many cells but becomes developed into all the variety of dissimilar tissues evolved from the homogeneous egg, but evolved from it, as we naturally suppose, because of the fact that the egg represents potentially all these tissues as existing previously in the parent organism.

But if we are content to waive these objections or to accept the solutions given of them by the "appearance and disappearance" argument, we still find that the phylogeny, unlike the ontogenesis, is full of wide gaps only to be passed *per saltum*, or to be accounted for by the disappearance of a vast number of connecting links. Of course it is easy to suppose that these intermediate forms have been lost through time and accident, but why this has happened to some rather than to others cannot be explained. In the phylogeny of man, for example, what a vast hiatus yawns between the ascidian and the lancelet, and another between the lancelet and the lamprey! It is true that the missing links may have consisted of animals little likely to be preserved as fossils; but why, if they ever existed, do not some of them remain in the modern seas? Again, when we have so many species of apes and so many races of men, why can we find no trace, recent or fossil, of that "missing link" which we are told must have existed, the "ape-like men," known to Haeckel as the "Alali," or speechless men?

A further question which should receive consideration from

the monist school is that very serious one: Why, if all is "mechanical" in the development and actions of living beings, should there be any progress whatever? Ordinary people fail to understand why a world of mere dead matter should not go on to all eternity obeying physical and chemical laws, without developing life; or why, if some low form of life were introduced capable of reproducing simple one-celled organisms, it should not go on doing so.

Further, even if some chance deviations should occur, we fail to perceive why these should go on in a definite manner producing not only the most complex machines, but many kinds of such machines on different plans but each perfect in its way. Haeckel is never weary of telling us that to monists organisms are mere machines. Even his own mental work is merely the grinding of a cerebral machine. But he seems not to perceive that to such a philosophy the homely argument which Paley derived from the structure of a watch would be fatal. "The question is whether machines (which monists consider all animals to be, including themselves) infinitely more complicated than watches could come into existence without design somewhere;"[1] that is, by mere chance. Common-sense is not likely to admit that this is possible.

The difficulties above referred to relate to the introduction of life and of new species on the monistic view. Others might be referred to in connection with the production of new organs. An illustration is afforded, among others, by the discussion of the introduction of the five fingers and toes of man, which appear to descend to us unchanged from the amphibians or batrachians of the Carboniferous period. In this ancient age of the earth's geological history, feet with five toes appear in numerous species of reptilians of various grades. They are preceded by no other vertebrates than fishes, and these have numerous fin-rays instead of toes. There are no properly transitional forms either fossil or recent. How were the five-fingered limbs acquired in this abrupt way? Why were they five rather than any other number? Why, when once introduced, have they con-

[1] Beckett, "Origin of the Laws of Nature."

tinued unchanged up to the present day? Haeckel's answer . a curious example of his method :

"The great significance of the five digits depends on the fact that this number has been transmitted from the Amphibia to all higher vertebrates. It would be impossible to discover any reason why in the lowest Amphibia, as well as in Reptiles and in higher vertebrates up to man, there should always originally be five digits on each of the anterior and posterior limbs, if we denied that heredity from a common five-fingered parent form is the efficient cause of this phenomenon ; heredity can alone account for it. In many Amphibia certainly, as well as in many higher vertebrates, we find less than five digits. But in all these cases it can be shown that separate digits have retrograded, and have finally been completely lost. The causes which affected the development of the five-fingered foot of the higher vertebrates in this amphibian form from the many-fingered foot (or properly fin) must certainly be found in the adaptation to the totally altered functions which the limbs had to discharge during the transition from an exclusively aquatic life to one which was partially terrestrial. While the many-fingered fins of the fish had previously served almost exclusively to propel the body through the water, they had now also to afford support to the animal when creeping on the land. This effected a modification both of the skeleton and of the muscles of the limbs. The number of fin-rays was gradually lessened, and was finally reduced to five. These five remaining rays were, however, developed more vigorously. The soft cartilaginous rays became hard bones. The rest of the skeleton also became considerably more firm. The movements of the body became not only more vigorous but also more varied"—

and the paragraph proceeds to state other ameliorations of muscular and nervous system supposed to be related to or caused by the improvement of the limbs.

It will be observed that in the above extract, under the formula "the causes . . . must certainly be found," all that other men would regard as demanding proof is quietly assumed, and the animal grows before our eyes from a fish to a reptile as under the wand of a conjuror. Further, the transmission of the five toes is attributed to heredity or unchanged reproduction, but this, of course, gives no explanation of the original formation of the structure, nor of the causes which prevented heredity from applying to the fishes which became amphibians, and acquired five toes, or to the amphibians which faithfully transmitted their five toes but not their other characteristics.

It is perhaps scarcely necessary to follow further the criticism

of this extraordinary book. It may be necessary, however, to repeat that it contains clear, and in the main accurate, sketches of the embryology of a number of animals, only slightly colored by the tendency to minimize differences. It may also be necessary to say that in criticising Haeckel we take him on his own ground, that of a monist, and have no special reference to those many phases which the philosophy of evolution assumes in the minds of other naturalists, many of whom accept it only partially or as a form of mediate creation more or less reconcilable with theism. To these more moderate views no reference has been made, tho there can be no doubt that many of them are quite as assailable as the position of Haeckel in point of argument. It may also be observed that Haeckel's argument is almost exclusively biological and confined to the animal kingdom, and to the special line of descent attributed to man. The monistic hypothesis becomes, as already stated, still less tenable when tested by the facts of paleontology. Hence most of the paleontologists who favor evolution appear to shrink from the extreme position of Haeckel. Gaudry, one of the ablest of this school, in his recent work on the development of the mammalia candidly admits the multitude of facts for which derivation will not account, and perceives in the grand succession of animals in time the evidence of a wise and far-reaching creative plan, concluding with the words: "We may still leave out of the question the processes by which the Author of the world has produced the changes of which paleontology presents the picture." In like manner the Count de Saporta in his "World of Plants" closes his summary of the periods of vegetation with the words:

"But if we ascend from one phenomenon to another, beyond the sphere of contingent and changeable appearance, we find ourselves arrested by a being unchangeable and supreme, the first expression and absolute cause of all existence, in whom diversity unites with unity, an eternal problem insoluble to science but ever present to the human consciousness. Here we reach the true source of the idea of religion, and there presents itself distinctly to the mind that conception to which we apply instinctively the name of God."

Thus these evolutionists, like many others in this country and in England, find a *modus vivendi* between evolution and theism. They have committed themselves to an interpretation

of nature which may prove fanciful and evanescent, and which certainly up to this time remains an hypothesis, ingenious and captivating, but not fortified by the evidence of facts. But in doing so they are not prepared to accept the purely mechanical creed of the monist or to separate themselves from those ideas of morality, of religion, and of sonship to God which have hitherto been the brightest gems in the crown of man as the lord of this lower world. Whether they can maintain this position against the monists, and whether they will be able in the end to retain any practical form of religion along with the doctrine of the derivation of man from the lower animals, remains to be seen. Possibly before these questions come to a final issue the philosophy of evolution may itself have been "modified" or have given place to some new phase of thought.

In some places there are in Haeckel's book touches of a grim humor which are not without interest, as showing the subjective side of the monistic theory, and illustrating the attitude of its professors to things held sacred by other men. For example, the following is the introduction to the chapter headed "From the Primitive Worm to the Skulled Animal," and which has for its motto the lines of Goethe beginning:

> "Not like the Gods am I! full well I know;
> But like the worms which in the dust must go."

"Both in prose and poetry man is very often compared to a worm; a miserable worm,' 'a poor worm,' are common and almost compassionate phrases. If we cannot detect any deep phylogenetic reference in this zoological metaphor, we might at least safely assert that it contains an unconscious comparison with a low condition of animal development which is interesting in its bearing on the pedigree of the human race."

If Haeckel's reading of Scripture had been sufficiently thorough, he might have quoted here the melancholy confession of the Man of Uz: "I have said to the worm, Thou art my mother and my sister." But tho Job, like the German professor, could humbly say to the worm, "Thou art my mother," he could still hold fast his integrity and believe in the fatherhood of God.

The moral bearing of monism is further illustrated by the following extract, which refers to a more advanced step of the

evolution, that from the ape to man, and which shows the honest pride of the worthy professor in his humble parentage:

"Just as most people prefer to trace their pedigree from a decayed baron, or if possible from a celebrated prince, rather than from an unknown humble peasant, so they prefer seeing the progenitor of the human race in an Adam degraded by the fall rather than in an Ape capable of higher development and progress. It is a matter of taste, and such genealogical preferences do not therefore admit of discussion. It is more to my individual taste to be the more highly developed descendant of an Ape, who in the struggle for existence had developed progressively from lower mammals as they from still lower vertebrates, than the degraded descendant of an Adam, God-like but debased by the fall, who was formed from a clod of earth, and of an Eve created from a rib of Adam. As regards the celebrated 'rib,' I must here expressly add, as a supplement to the history of the development of the skeleton, that the number of ribs is the same in man and in woman.[1] In the latter as well as in the former the ribs originate from the skin-fibrous layer, and are to be regarded phylogenetically as lower or ventral vertebræ." [2]

There is no accounting for tastes, yet we may be pardoned for retaining some preference for the first link of the old Jewish genealogical table—"which was the son of Adam, which was the son of God." As to the "debasement" of the fall, it is to be feared that the aboriginal ape would object to bearing the blame of existing human iniquities as having arisen from any improvement in his nature and habits; and it is scarcely fair to speak of Adam as "formed from a *clod* of earth," which is not precisely in accordance with the record. As to the "rib," which seems so offensive to Haeckel, one would have thought that he would, as an evolutionist, have had some fellow-feeling in this with the writer of Genesis. The origin of sexes is one of the acknowledged difficulties of the hypothesis, and using his method we might surely "assume," or even "confidently assert," the possibility that, in some early stage of the development, the unfinished vertebral arches of the "skin-fibrous layer" might have produced a new individual by a process of budding or gemmation. Quite as remarkable suppositions are

[1] It was scarcely necessary to refer to this childish conception, unless the individual skeleton of Adam had been in question.

[2] Rather, "vertebral arches."

contained in some parts of his own volumes, without any special divine power for rendering them practicable. Further, if only an individual man originated in the first instance, and if he were not provided with a suitable spouse, he might have intermarried with the unimproved anthropoids, and the results of the evolution would have been lost. Such considerations should have weighed with Haeckel in inducing him to speak more respectfully of Adam's rib, especially in view of the fact that in dealing with the hard question of human origin the author of Genesis had not the benefit of the researches of Baer and Haeckel. He had no doubt the advantage of a firm faith in the reality of that Creative Will which the monistic prophets of the nineteenth century have banished from their calculations. Were Haeckel not a monist, he might also be reminded of that grand doctrine of the lordship and superiority of man based on the fact that there was no "helpmeet for him;" and the foundation of the most sacred bond of human society on the saying of the first man: "This is now bone of my bones, and flesh of my flesh." But monists probably attach little value to such ideas.

It may be proper to add here that in his references to Adam Haeckel betrays a weakness not unusual with his school, in putting a false gloss on the old record of Genesis. The statement that man was formed from the dust of the ground implies no more than the production of his body from the common materials employed in the construction of other animals: this also in contradistinction from the higher nature derived from the inbreathing or inspiration of God. The precise nature of the method by which man was made or created is not stated by the author of Genesis. Further, it would have been as easy for divine power to create a pair as an individual. If this was not done, and if after the lesson of superiority taught by the inspection of lower animals, and the lesson of language taught by naming them, the first man in his "deep sleep" is conscious of the removal of a portion of his own flesh, and then on awaking has the woman "brought" to him, all this is to teach a lesson not to be otherwise learned. The Mosaic record is thus perfectly consistent with itself and with its own doctrine of creation by Almighty Power.

I have quoted the above passages as examples of the more jocose vein of the Jena physiologist; but they constitute also a serious revelation of the influence of his philosophy on his own mind and heart, in lowering both to a cold, mechanical, and unsympathetic view of man and nature. This is especially serious when we remember how earnestly in a recent address he advocated the teaching of the methods and results of this book as those which, in the present state of knowledge, should supersede the Bible in our schools. We may well say, with his great opponent on that occasion, that if such doctrines should be proved to be true, the teaching of them might become a necessity, but one that would bring us face to face with the darkest and most dangerous moral problem that has ever beset humanity; and that so long as they remain unproved it is both unwise and criminal to propagate them among the mass of men as conclusions demonstrated by science.

J. W. DAWSON.